Volume 77 Number 8
August 2009

Amateur Radio

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WIRELESS INSTITUTE OF AUSTRALIA

Echoes of APOLLO

EME on three milliwatts

Amateur radio on the edge

REMEMBRANCE DAY CONTEST

Details in this issue

ISSN 0002-6859

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Remembrance Day Contest

15 -16 August 2009

The Remembrance Day Trophy - Certificate & Honour Roll

This contest commemorates the amateurs who died during WWII and is designed to encourage friendly participation and help improve the operating skills of participants. It is held close to 15 August, the date in 1945 when hostilities ceased in the south-west Pacific. The perpetual trophy (shown) is awarded annually to the State or Territory with the best performance. The winner holds the trophy for 12 months. They are also given a Certificate, as are leading entrants in each state/category.

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Information from WIA WA website courtesy of Neil Penfold VK6NE

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Our Cover this month

This issue features the Echoes of Apollo activity weekend — The World Moon Bounce Day — held over the last weekend in June. The telescope featured largely in the event and is the 26 metre radio telescope at the University of Tasmania's Mount Pleasant Observatory near Hobart.

Telescope photo by Dr Jim Lovell, UTAS; Buzz Aldrin image courtesy of NASA; Design by G Nieman.

Contributions to Amateur Radio

Amateur Radio is a forum for WIA members' amateur radio experiments, experiences opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for publication. Articles on disc or email are especially welcome. The WIA cannot be responsible for loss or damage to any material. A pamphlet, 'How to write for Amateur Radio' is available from the National Office on receipt of a stamped self-addressed envelope.

Back Issues

Back issues are available directly from the WIA National Office (until stocks are exhausted), at $8.00 each (including postage within Australia) to members.

Photostat copies

When back issues are no longer available, photocopies of articles are available to members at $2.50 each (plus an additional $2 for each additional issue in which the article appears).

Disclaimer

The opinions expressed in this publication do not necessarily reflect the official view of the WIA and the WIA cannot be held responsible for incorrect information published.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs; that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

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International Amateur Radio Union

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Editorial

Peter Freeman VK3KAI

A busy month (again)

The last month has again been busy in Churchill. On the radio front, there has not been much happening in the VK3KAI shack – work and other matters have been at the forefront. Therefore there has been another month of minimal progress on my long list of "to do" jobs.

A major event occurred, for both myself and the local club – the annual GippsTech event was held on the second weekend of July. We were hoping that hosting the WIA AGM Weekend of Activities, including GippsTech – Special Edition, would not seriously impact on our club's signature event.

Although registrations were initially slow, we ended up with 125 people registered, which included 13 for the partners' activities. I have not had time to look back at the records, but this must be close to the maximum number of participants to date.

We enjoyed a very full weekend of talks, with a predominance of technical topics and some of more general interest. Everyone seemed to be very happy overall with the presentations, with many only complaining that the event was too short.

Several suggested possible topics for next year. Of course, much like this magazine, the event depends on individuals volunteering to present material on a topic. We shall see if we can convert some of the interest into real presentations for next year!

I am not sure if we will be able to source a detailed report for this magazine, but there was insufficient time to include a report in this issue.

I do like to keep work separate to hobby, but the end of semester becomes crazy, with increased administrative loads on top of the need to mark large piles of examination papers – enough of that topic – it can be rather depressing….. On top of the end of semester workload, there is virtually no respite before one is busy finalising the details for the commencement of semester two.

Oh well, only another 13 weeks or so until it all happens again. At least once that is all over, there is a little respite over a few weeks of summer before it all starts again next year.

Echoes of Apollo

This issue features reports from Tasmania and Victoria of the Earth-Moon-Earth contacts made over the last weekend in June – designated as World Moon Bounce Day. The idea, as far as I can tell, arose from Pat Barthelow in the US, with Robert Brand locally in Australia also promoting the event.

Whilst the event was about a month early for the fortieth anniversary of the Apollo 11 landing on the moon, the event dates were chosen to allow for the possible inclusion of Australian earth stations which have limits with regard to actually pointing at the moon: For those not aware of the orbital mechanics for the moon, it can vary significantly with respect to the "declination" – the plane of the moon's orbit moves with respect to the Earth's equator.

Whilst all of the proposed activities may not have eventuated, it is clear that many amateurs around the world were active on the 23 cm band over the weekend. Many had local television news coverage, providing an excellent lead in to the Apollo anniversary activities and also promoting amateur radio in general and EME in particular.

It will be interesting to see if this activity continues. What is quite clear is that the general idea "had legs". Congratulations to all Australian amateurs who became involved. I especially thank Rex VK7MO, Justin VK7TW and Doug VK3UM for their timely detailed reports.

Contributions

Thanks to the people who contacted me, prompted by the request for articles published on the July mailing labels. Several articles will be published shortly.

As I have implied above, this magazine relies on YOUR contributions. Yes, the article review process may take time, but most are accepted and published.

It has taken some time to come to fruition, but the September issue should see the appearance of a new occasional column – Foundation Corner. We are keen to have more articles that are aimed at our Foundation licensee readers, so please think about material that you can collate into an appropriate article.

Or let me know about a topic of particular interest and I will source an article or pass the suggestion on to our new contributor.

More news on this topic next month!

Cheers, Peter VK3KAI

ar

Michael Owen VK3KI

The increasing importance of the regional organisations

I believe that one of the most important functions of the WIA is to act to protect and enhance the privileges of radio amateurs.

The very existence, the basic regulation and frequency bands of the amateur and amateur satellite services originates in the Radio Regulations of the International Telecommunications Union, the ITU, formulated and amended through its World Radiocommication Conferences (WRC) held every three or four years.

So, to perform its function the WIA must work within the framework that leads to each WRC, to deal with those agenda items that may affect, either directly or indirectly, the amateur services.

In this Comment I want to raise some issues in relation to this function, and to do this I want to look at both the processes of the ITU and the processes of our regional telecommunications organisation, even though talking of the two processes does make it all look a bit complicated.

An ITU Conference Preparatory Meeting (CPM) is held immediately after a WRC to establish a work plan for the next WRC. Technical studies are assigned to various Working Parties in the ITU Radiocommunication Sector (ITU-R). The outcome is an agreed text for a comprehensive technical report that is adopted at a second CPM held about eight months prior to the WRC. That CPM develops a Report that sets out various summaries and an analysis of the results of the studies, setting out various methods to satisfy each agenda item, and regulatory and procedural considerations.

The amateur services are primarily represented at the CPM and in the ITU-R Sector technical studies by the International Amateur Radio Union, the IARU, which participates as an international organisation and is a Sector Member with the ability to provide direct input, primarily through the International Secretariat, the ARRL. Amateurs may also be members of participating national delegations.

In January this year ARRL CEO and IARU Secretary David Sumner K1ZZ distributed a paper describing the current state of the evolution of the process by which the international Radio Regulations of the ITU are amended by a World Radiocommunication Conference (WRC).

David stressed the growing importance of the regional telecommunications organisations – he called them RTOs, but because in our world RTO has such a precise meaning, I will call them ROs - suggesting that it is now the RO that has become the mechanism by which agreement can be reached on many matters. He argued that the ITU, which tries to operate as much as possible by consensus, with 191 member states, 85% of which participate at least on a token basis, would find it very hard to reach agreement without the ROs.

The six ROs that participate actively in the WRC process are:

African Telecommunications Union (ATU)

Asia-Pacific Telecommunity (APT)

Conference of European Postal and Telecommunications Administrations (CEPT)

Inter-American Telecommunication Commission (CITEL)

Arab Spectrum Management Group (ASMG)

Regional Commonwealth in the field of Communications (RCC)

The RCC is comprised of the countries in and around the former Soviet Union.

The voting members of the ITU, a specialised agency of the United Nations, are sovereign states, or separate countries. The IARU does not have a vote at a WRC, it can only be an observer.

For many years the CEPT has been very effective, presenting common positions on many issues at WRCs. A common position is simply a bloc of votes on a particular issue by countries who have reached agreement on that issue and are the members of the RO.

In recent years, the meetings of the APT conference preparatory groups to identify common positions for the next WRC have become increasingly important. For example, before the 2003 WRC a common position was not adopted unless there was a real consensus in relation to the issue. Now the mechanisms to identify a common position, representing the vote of only a number of member countries, are much more effective.

The importance of the bloc of votes represented by the APT APG (as the APT conference preparatory group is called) is certainly recognised by our own administration.

The second of probably four meetings of the APG for the next WRC, now to be held in early 2012, I guess now to be referred to as WRC-12, was held from 22nd June to 26th June this year in Hangzhou, China.

At an international level, the three IARU Regional organisations are responsible for representing the amateur service to the ROs in their Region.

IARU Region 3 participated in the APG in China and was represented by Director Shizuo Endo JE1MUI.

IARU Region 3 Secretary Jay Oka JA1TRC was a member of the Japanese delegation, representing the amateur service and nominated by JARL. IARU Region 3 Director Joong-Geun Rhee HL1AQQ was a member of the Korean national delegation, representing a number of interests.

IARU Region 3 submitted an information paper on the agenda items for WRC-2011 that concern the amateur and amateur satellite services, particularly focussing on agenda item 1.23, which is the possibility of a new secondary allocation to the amateur service of about 15 kHz somewhere in the band 415 – 526.5 kHz.

The growing importance of the ROs, particularly in our Region–the APT–present a number of challenges, some of which will, hopefully, be addressed at the upcoming Fourteenth IARU Region 3 Conference in Christchurch from 12 to 16 October 2009.

Continued foot of next page

A Call For Historical Articles

Peter Wolfenden VK3RV

With the Centenery of Amateur Radio in Australia coming up next year, Amateur Radio intends to run a series of articles about the development of the activity in Australia. We need your help.

Prior to 1910 a very limited number of individual experimenters were transmitting wireless signals; the vast majority were only attempting to receive transmissions.

On the 11 March 1910 a group of Wireless Telegraphy enthusiasts met at the Hotel Australia in Sydney to discuss the formation of an organisation to represent them. Established as **The Institute of Wireless Telegraphy of Australia**, it changed its name to the **Wireless Institute of New South Wales** about 10 months later.

A similar group was established in Melbourne during 1911, **The Amateur Wireless Society of Victoria**, it too changed name later to the **Wireless Institute of Victoria**.

As interest grew in the new science, district clubs started to form and during the mid 1920s radio clubs were numerous. Most of these clubs were predominately made up of licensed receiving members but they were keen to learn about wireless. Membership came from all walks of life. Some clubs even had very senior academics and legal people as active members. The "magic" of wireless was capturing the public's imagination and even more so when amateur experimenters blazed the new trails of world-wide communication using short waves and low power. The ability to communicate with like minded people in distant countries captured the public's imagination and the amateur ranks grew substantially.

One hundred years on, clubs still form the focal-point for enthusiasts to meet their fellow amateurs and obtain technical and social connexions; but more than ever before, it is paramount that a national umbrella organisation exists to retain the amateur experimenter's hard won rights for access to the radio spectrum!

So in 2010, the Wireless Institute of Australia is proud to celebrate – **100 years of organised private (or amateur) radio communications in Australia.**

During 2010 we intend to publish a series of articles on the history of amateur radio in Australia.

Perhaps you can contribute? You may be able to write a history of a club, or perhaps some events associated with radio, perhaps the story of an individual.

Please submit your article, preferably with some illustrations, to ***Amateur Radio***. All historical articles should be submitted to the WIA Centenary Committee, who will ensure that the best are published in one of the 11 issues of *AR* in 2010.

ar

Echoes of Apollo — the genesis

Robert Brand

Making EME history about one of the most notable events in living memory.

The *Echoes of Apollo* project began when Pat Barthelow AA6EG from the US contacted the Overseas Telecommunications Veterans Association (OTVA) (http://www.otva.com/).

Pat's intent was to help achieve an historic EME contact between the Jamesburg Earth Station in California, USA, and the Parkes Dish in NSW, Australia, as both had taken part in the Apollo 11 TV coverage around the world in 1968.

His contact was in December 2008 but by mid January 2009 the OTVA felt that this was beyond their resources and legal capabilities. Robert Brand, an Australian member of the OTVA, became involved and Pat and Robert formed the *Echoes of Apollo* (EoA) group.

It was decided that EoA should include the rest of the world in the plans and *World Moon Bounce Day* was created.

The project operates in a "not for profit" mode and includes many opportunities for amateur activities.

The dates and plans were circulated around the world and EoA received support from both the University of Tasmania using their 26 m dish at Mt Pleasant and the SRI International's dish at Stanford University.

World Moon Bounce Day was proposed to be similar to the Jamboree of the Air and include children and students. Broadcast radio and TV coverage occurred in Australia and Switzerland.

WIA comment

Continued from page 3

May I identify some of the broader issues as they occur to me?

The IARU in its present structure is essentially four separate organisations addressing the same issue in at least four separate forums, only loosely held together by the Administrative Council, meeting only annually. While there can be no doubt that each shares a common aim, how do we develop and maintain and adjust a policy for each WRC that each IARU entity can follow? In simple terms, how can we coordinate the various IARU entities working to a common end?

Equally importantly, how do we ensure that information flows to and from those from a national society representing the amateur services at a national level of WRC preparation?

How do we ensure that each of the IARU regional organisations obtains the funds and develops and retains the expertise and will to represent the amateur services effectively to each of the ROs I have identified?

Would a change in the structure of the IARU be likely to improve the ability of the IARU, either as a number of organisations or as a single organisation, to better represent the amateur services?

Closer to home, given the growing importance of the APT APG, should the WIA be looking to nominate an amateur specialist not only as a member of our national delegation to the WRC but also to at least some meetings of the PG?

ar

A transmission line balance test meter

Lloyd Butler VK5BR

Here is a simple meter to check the balance of currents running in the two legs of a transmission line. It can be used to check the balance of currents between the inner conductor and the outer conductor in a coax cable as well as between the legs of an open wire pair.

Introduction

A typical amateur radio antenna installation makes use of a simple dipole or other balanced form of antenna fed via a coaxial transmission line.

Because the line is unbalanced, some form of unbalanced to balanced coupling is normally necessary between the coaxial line and the antenna. Without this coupling, a condition is set up where currents running in the inner and outer legs of the coax line are unbalanced and a common mode or longitudinal current component is developed along the length of the line, causing radiation from the line.

Apart from distorting the radiation pattern inherent to the antenna proper, it encourages annoying induction into equipment and wiring within the radio shack as well as on receiving encouraging induction of vertically polarised near field noise.

A typical balancing interface is the choke balun which must have sufficient common mode rejection impedance to minimise the longitudinal current component. Whilst most radio amateurs possess an SWR meter which can be used in series with the coax line to check how well the antenna is matched to the 50 ohm line, it gives no indication that the currents running in the two legs of the line might be unbalanced.

The SWR meter can show a perfect 1:1 SWR indicating that the antenna is loading the line with a resistance of 50 ohms. However with such a condition indicated there can still be a high longitudinal component flowing and radiation from the line.

Whether there is a serious unbalance of currents in the line legs can easily be checked by measuring the two currents. However it does not seem to be something which is routinely done in checking out the antenna system and verifying whether the coupling interface (such as the choke balun) is adequate for the job.

To check out balance of line leg currents in such antennas as the EH, I have previously made use of thermocouple RF ammeters, one inserted in series with each leg. I experienced current difference as high as 2 to 1. Such RF meters were commonplace in transmitters of an earlier era but I do not see them any more as items in our local electronics shops. Whilst Old Timers like myself still have them, they are probably not too plentiful on the shelves of radio amateurs more recently introduced to amateur radio.

Instead it seemed to me that there was a need for a simple test unit to check out the line balance by connecting it in series with the coax line much like one would connect in the SWR meter to check out the line to antenna matching. So the 'transmission line balance test meter' is born.

The balance test meter

The circuit diagram is shown in Figure 1.

All we need is two identical ferrite toroidal cores to make up current transformers, one placed in series with each leg of the coax line. The outputs from the secondaries of the two transformers are fed through a selection switch into a rectifier and filter circuit to give a line current indication on a micro-ammeter.

By selecting one, and then the other, of the two positions of the switch, the currents in the two legs of the line can be compared. If near to equal, we can be satisfied that the balance is adequate.

If different, there is a common mode current component on the line and we can expect it to radiate. To get rid of this component, we may have to improve the balancing interface between the line and the antenna. If a choke balun is used this might mean increasing the inductance of the balun unit.

In my unit I used Philips Ferroxcube cores type 97170 which are only 9 mm in external diameter. As I have had these for well over 20 years, they are likely to be no longer available but almost any small toroid with ferrite suitable for HF should do the trick. I placed 15 turns of enamel covered wire on each toroid. Neither the wire gauge nor the number of turns is critical but

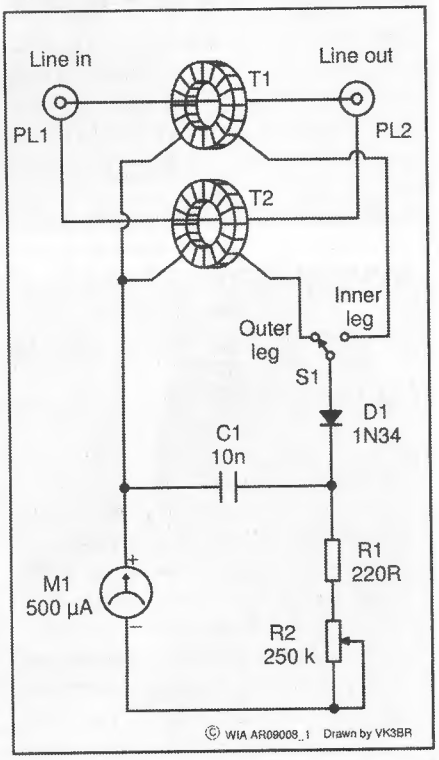

Figure 1: The circuit diagram of the balance meter.

the transformers as made must be identical. The wound toroid is shown in Photo 1.

The 500 microamp meter used was selected from the spares box simply because it was a small one which fitted nicely in the housing box. With this meter, I get a comfortable reading using about 10 to 15 watts running in a 50 ohm line.

However if the meter has to be purchased, I suggest aiming for a 50 or 100 micro-amp movement which would allow operation on considerably lower power.

I used a plastic box which I purchased rather than one of the aluminium boxes I had on hand. I did this so that in fitting input and output connectors to the box, the outer poles floated.

The connectors were mounted close together and their pole connections were each strapped together with the strap passing through one of the wound ferrite cores to form the primary of the current transformer.

I used BNC connectors which by habit I have always used on my test gear. However the so called UHF connectors are quite standard on most commercially made amateur radio transceivers and one might prefer to fit the usual SO238 sockets.

The finished unit can be seen in Photo 2. Photo 3 is a look at the rear. As can be seen, I found a spare tag strip to mount the few resistors and the capacitor.

Check-out and use of the unit

To check out the test unit, feed the output of the transmitter set for low power through the unit into a 50 ohm dummy load using coax links. Set the transmitter output for low power. Make sure that the load is floating so that there is no return path from the dummy load via an earth connection.

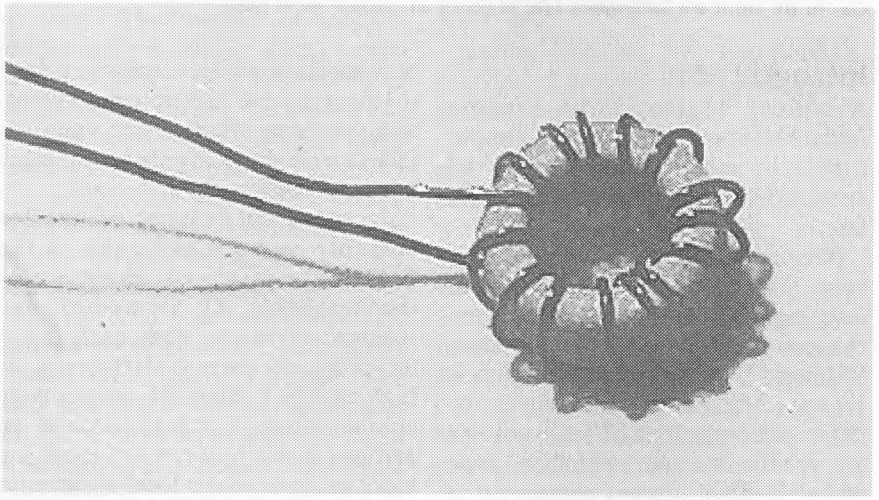

Photo 1: The toroid core used in the circuit.

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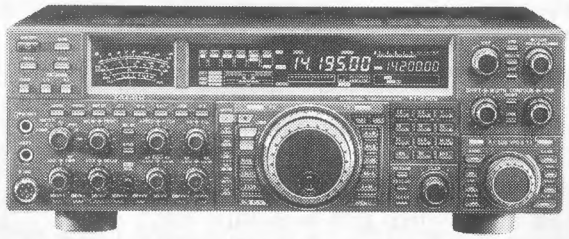

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Adjust for a suitable reference reading on the meter, adjusting the transmitter power, or the sensitivity control R1 on the unit, or both. The meter reading should read the same for both positions of the switch S1 and if so, the unit is ready to connect in series with the transmission line to check the line leg balance.

If, when connected in series with the line, the meter reads near the same for both positions of the switch, the currents in the inner and outer legs of the line are near the same and one can be satisfied that there is little common mode current running in the line.

If they are considerably different, then may be an improvement in the antenna coupling interface is indicated.

I have talked essentially about currents in the inner and outer legs of a coax line. However as the connectors in the test unit are floating, the unit can also be used to check the comparative currents running in a line pair such as a balanced open wire feedline.

I wondered how much mismatch would be introduced in a 50 ohm line by the insertion of the coupling straps with the current transformers. So I fed the transmitter through an SWR meter and the test unit into a precision 50 ohm load.

For 1.8 MHz and the HF amateur bands, there was no noticeable shift in the 1:1 SWR reading with the test unit connected except for a very slight shift at 28 MHz. I did observe that to get the same meter readings, a little more power was needed at the higher frequencies than at the lower frequencies. I did not think this was important as the meter only had to make a comparison between two readings both at the same frequency.

I was not looking to use the unit at VHF but I did try it out on the two metre band. The meter gave readings OK but it did upset the SWR reading considerably.

So to make a model of the unit for VHF, some improved form of current monitoring is indicated, such as the method used on SWR meters made for VHF.

Conclusion

In conclusion I repeat what I said at the start. Checkout of whether there is common mode or longitudinal current component on the transmission line seems to be something which is rarely carried out.

I have described a very simple instrument which can do the checkout by simply comparing the currents in the two transmission line legs. It is suitable for use on the HF bands and the 1.8 MHz band and can be used to check both coax lines and line pairs.

If there is a longitudinal current component developed in the line, one can never be sure whether performance achieved is due to the antenna proper or due to radiation from the transmission line. Hence the need for this sort of test.

Footnote

If an unbalance of currents is measured in the legs of the transmission line, an interesting experiment is to measure the current running in the earth connection to the transmitter.

To do this, the transmitter has to be isolated from the power mains, either by running it from batteries, or inserting an RF filter in the mains lead. (In testing for unbalanced current in the coax line feeding EH antennas, I found that the current measured in the earth connection was equal to the difference in the currents measured in the inner and outer legs of the coax.

I would be interested to know what result someone else might get if they carry out this particular experiment).

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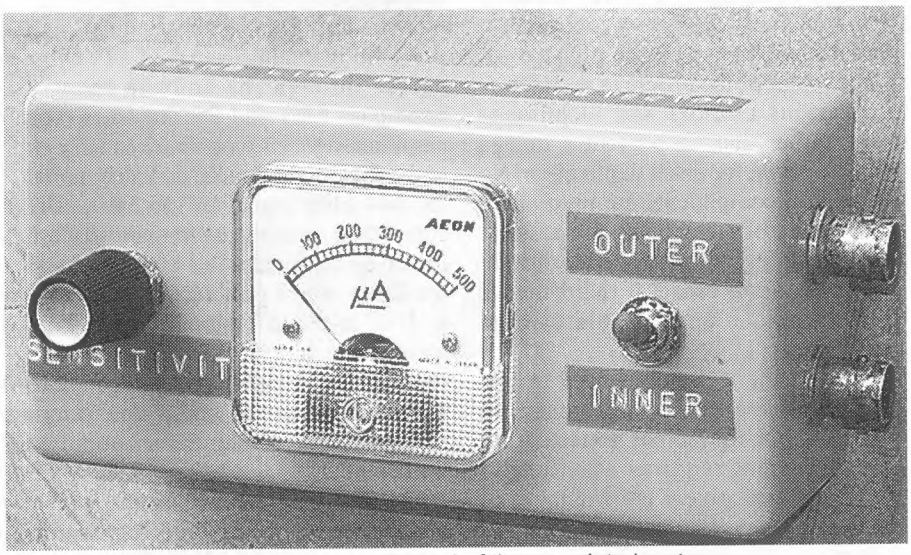

Photo 2: The front panel of the completed meter.

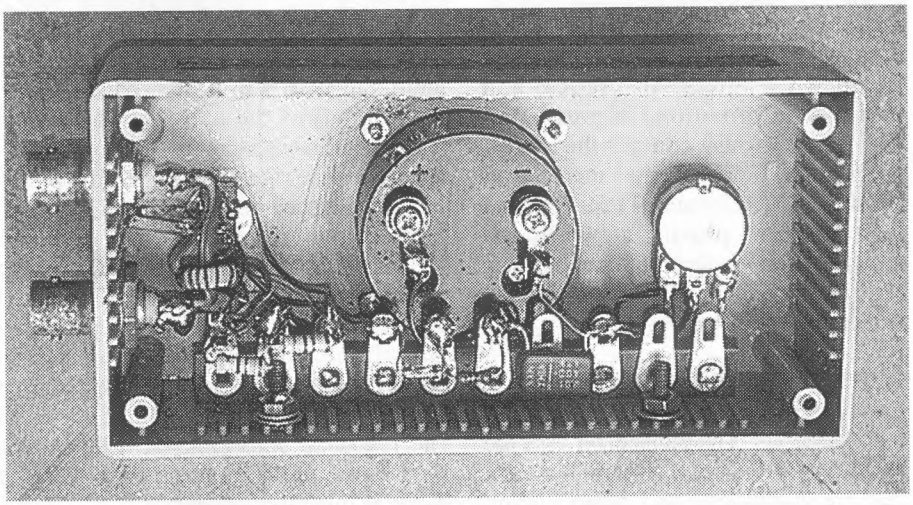

Photo 3: An internal view of the meter from the rear, showing the component layout.

A phasing type transceiver for 144 MHz – Part 1

Dale Hughes VK1DSH

This article describes the design and construction of a SSB transceiver for the 2 metre band. The original intent was to develop the device as a replacement for an elderly IC-202 which is used as the IF system for a 3 cm transverter; however it quickly became apparent that the unit could be used as a stand-alone transceiver as well. This dual functionality is reflected in the ability to bypass and disable the transmitter power amplifier and the provision of rear-panel connectors for the low level RF signals.

The design uses the techniques of direct conversion (sometimes called 'zero-IF') and 'phasing', or 'image rejection', whereby the unwanted sideband is cancelled out through manipulation of the phase and amplitude of both the carrier frequency and modulating audio frequencies. Conceptually it is a relatively simple process, but implementation can be complicated.

The intent of the article is to describe the various circuits and techniques used, rather than to present a design that is suitable for exact duplication. No specialised components are used and a wide variety of substitutions are possible and even desirable; the determined constructor can create a radio that is entirely unique and capable of high performance.

None of the techniques used in this transceiver are new or exceptionally difficult, but the actual construction and alignment requires attention to detail and a relatively large number of components.

Much of the design is based around work published in various books, magazines and web pages and intending constructors should consult the references supplied for further theoretical and practical information. In particular, the reader should consult the ARRL publication "Experimental methods in RF design" (Reference 1) for detailed information on phasing networks and direct conversion techniques. The book contains a wealth of relevant information and is highly recommended.

General description

Figure 1 shows the block diagram of the transceiver. The transceiver uses the technique of 'direct conversion' except that the modulation and demodulation takes place at 116 MHz instead of 144 MHz; a mixer and 28 MHz variable frequency oscillator are used to convert the 144 MHz signal to/from 116 MHz. This was done so that a fixed frequency RF quadrature network could be used to generate the required quadrature (90 degree) phase shift of the carrier frequency.

Considering the receive signal path first: the incoming signal at 144 MHz passes through the antenna relay, a band-pass filter and RF amplifier. The amplified signal is then switched through to the first mixer which 'down converts' the 144 MHz signal to 116 MHz. The signal then passes to two mixers that are driven by the quadrature 116 MHz local oscillator which produces two outputs: a 'I' or in-phase channel and a 'Q' or quadrature-phase channel. Both the channels are amplified separately before passing through an audio quadrature phase network, combined and amplified for listening.

The transmit path is very similar and the same mixers and quadrature networks are used for both the receiver and transmitter. The signal from the microphone is amplified and amplitude limited by a dual low noise op-amp. The audio signal is then switched through to the input of the audio quadrature network which generates the in-phase and quadrature signals which then drives the two balanced mixers.

The outputs of the two mixers at 116 MHz are then combined in a Wilkinson combiner (or splitter when considering the receive path), which then passes to the first mixer where it is up-converted to 144 MHz, filtered, amplified and passed through to the power amplifier stage. The PA stage amplifies the milliwatt level signal up to approximately three Watts. While this may seem QRP to the die-hard HF operator, three Watts can be remarkably useful at VHF and of course, is a useful level to drive an additional linear amplifier, if desired.

The 28 MHz variable frequency oscillator is based on "Direct Digital Synthesis" technology as this provides a very stable and (relatively) low noise local oscillator signal for the up/down-conversion process. Frequency selection is done using a small rotary shaft encoder and the current version of the software supports 1 kHz and 10 Hz step rates which are selected via a front panel switch. The tuning dial can also be locked to prevent inadvertent frequency changes. Two frequency memories are provided so that the transceiver can be quickly switched between favourite frequencies; the memories can be easily set from the main tuning dial.

Note that there is nothing special about the combination of frequencies used: 116 MHz and 28 MHz, as the choice was based on the fact that I had a 116 MHz crystal available. As the DDS output is usable to approximately 60 MHz, it would be possible to use other combinations of frequencies that would add up to 144 MHz. In fact, this might offer some benefits as the carrier suppression of the second mixers is likely to be better at lower frequencies so using 90 MHz and 54 MHz might be a viable way to increase carrier suppression.

As a microcontroller is required to operate the DDS chip, it was convenient to use it to control the other functions of the transceiver e.g. drive the Liquid Crystal Display, control the T/R switching, generate a "roger beep", provide frequency memories etc. An Atmel ATmega16 chip was used as this suited the existing DDS circuit board which has been used in a number of other projects.

Power to the various stages of the transceiver is supplied by linear regulators and a DC-DC convertor which generates the +/- 12 V DC supplies for the op-amps circuitry. Transmit-receive switching of the audio and radio frequency signals is done using miniature SMD latching relays which were obtained at low cost through surplus channels. Power is switched to several stages using larger chassis mounted relays.

During development of the transceiver it was found that stability was difficult to maintain due to the high gain employed in the various audio and RF stages. The solution was found to be the application of screening; extensive decoupling, earthing and switching off power to unneeded stages during receive and transmit. The end result is a radio that is stable and well behaved, with good sensitivity and signal handling capability.

In general, each section of the transceiver is built on its own printed circuit board, with interconnections made using miniature screened cable. This was done so that the various sections could be separately built and tested. The following sections describe each of the functional blocks in more detail. Note that component identification is local to each circuit board.

Modulation, demodulation and audio circuitry

Most of the signal processing - modulation and demodulation - takes place on a single circuit board (see Figure 2). The circuit is not as complex as it looks. This board holds the mixer diplexers, receive and transmit audio amplifiers. For clarity of function, connections to the audio band pass filter and quadrature network are shown.

So that the mixers are correctly terminated over a wide range of frequencies, LC diplexers (L1, L2 and associated components) are used to provide the correct impedance termination for both wanted and unwanted mixer outputs. The diplexer provides a useful amount of filtering which helps the final selectivity of the receiver. The inductors are wound on RM6 size ferrite cores, 135 turns of 0.25 mm wire was wound on the former and the adjustment screw was then adjusted so that the inductance was the same for each unit.

After the signal passes through the diplexer it is amplified by two low noise op-amps (in each channel) and additional filtering is provided by a RC low pass filter between amplifier stages. The two stages of amplification give approximately 60 dB of gain at audio frequencies. The I and Q amplifiers are identical so that the signals in both channels are treated the same. Any imbalance in either the gain or phase response of the channels will degrade the suppression of the unwanted sideband. Following amplification and filtering, the signal is passed to the audio quadrature board, the output of which is switched back through the signal processing board where it is combined and sent to the audio output amplifier PCB.

Final adjustment of the gain balance can be done using a trimmer potentiometer which acts as a summing junction for the I and Q channels. The combined signal is then passed to the audio power amplifier on another PCB.

When the transceiver is switched to transmit the direction of the signal flow changes and the board now acts as a modulator. Audio signals from the microphone are amplified and amplitude limited by two low noise amplifiers (U7 A &

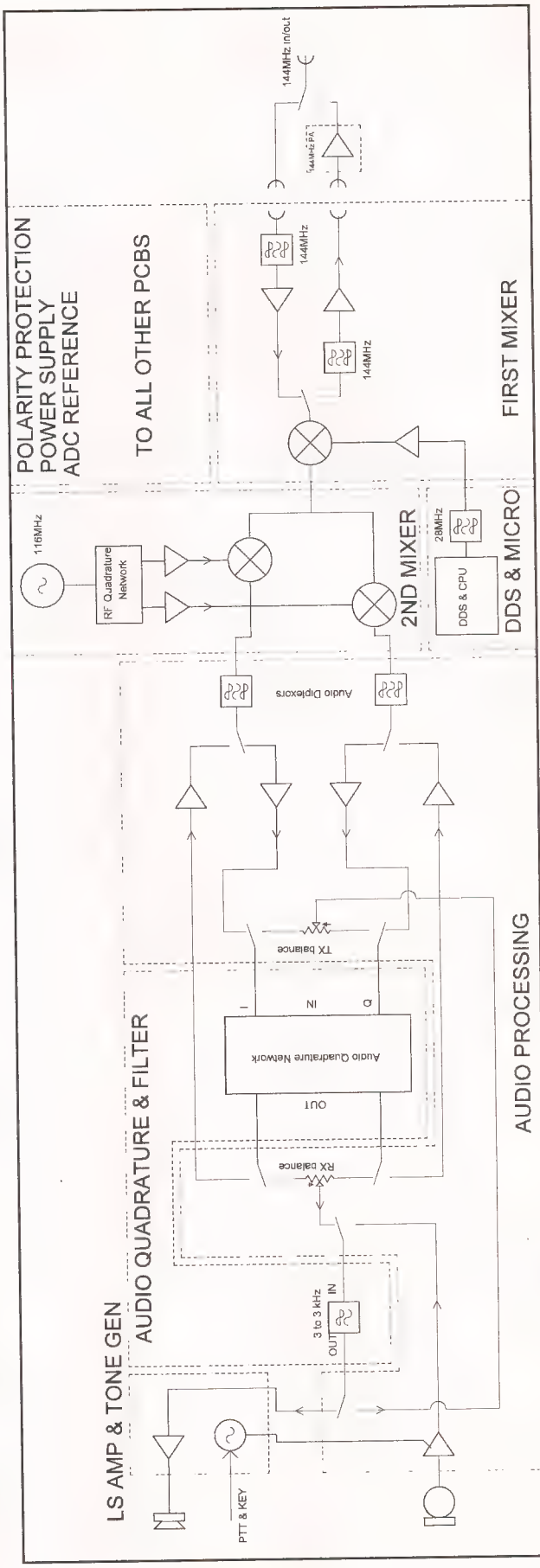

Figure 1: Block diagram. The dashed lines indicate the various modules that are built on separate printed circuit boards.

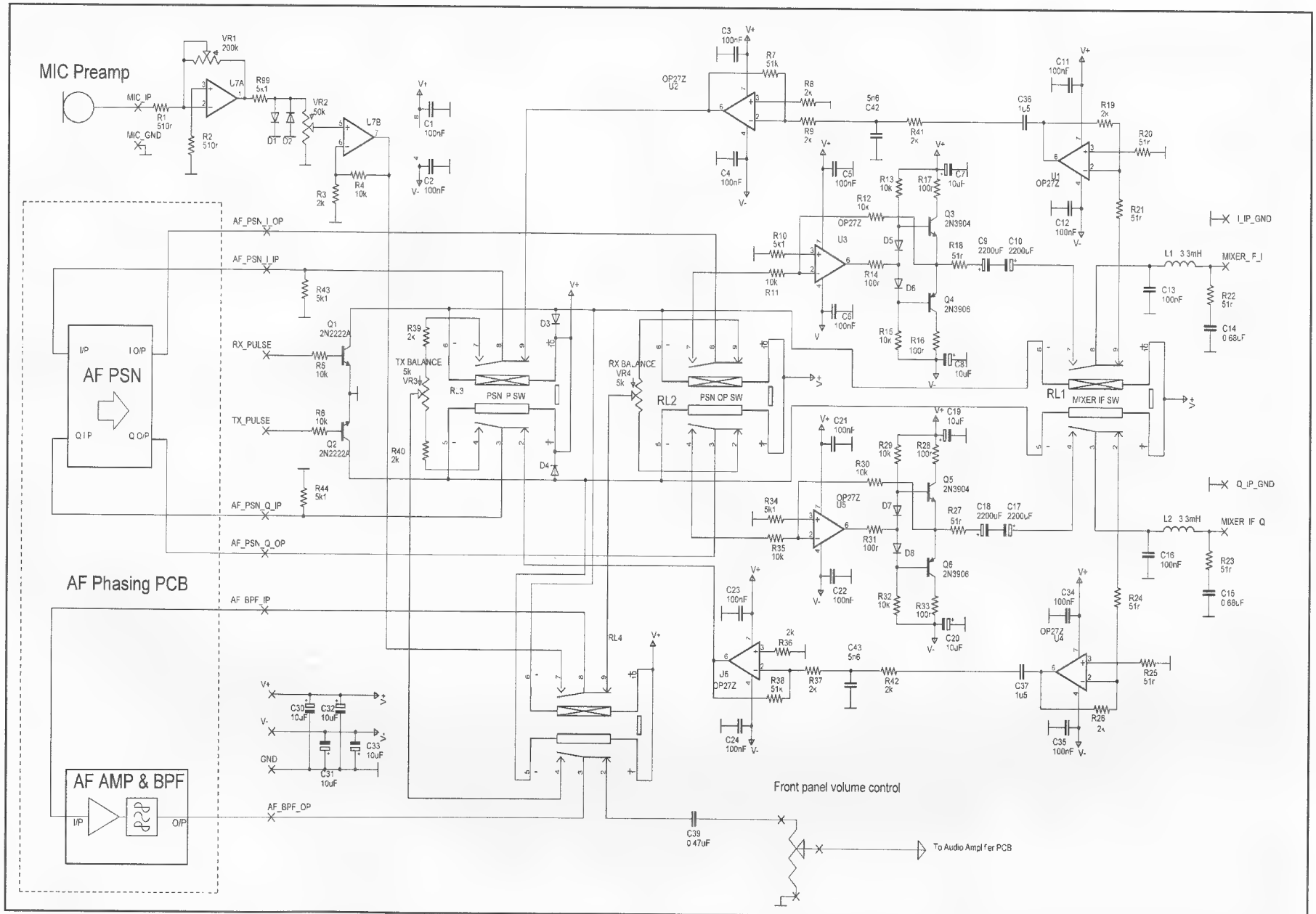

Figure 2: Audio processing board, showing interconnections to audio quadrature and filter board. While I used a dynamic microphone, an electret type could be used by adding the appropriate bias resistor and DC blocking capacitor to the input of amplifier U7A.

B). They are then passed to the audio band pass filter and quadrature network which now operates in such a way to produce two audio channels (I and Q) in phase quadrature. The two channels are buffered by op-amp/transistor power amplifiers (U3, U6 and associated components) which drives the balanced mixers via the diplexers. Amplitude balance of the transmit path can be controlled by another trim pot.

The audio band-pass filter and quadrature networks (see Figure 3) are built around low-noise op-amps which are readily obtainable. The quadrature network uses cascaded op-amps in an "all-pass" filter configuration. As the amount of unwanted sideband suppression depends on the accuracy of the quadrature network a multi-stage design was chosen, the circuit was taken from Reference 1.

This results in a network that gives an accurate phase shift of 90 degrees over a frequency range of approximately 200 Hz to 4 kHz. Frequencies outside of that range are attenuated by a LC band pass filter. These stages contribute about 20 dB to the receiver gain. Overall receiver selectivity and transmission bandwidth is set by the response of the band pass filter; an LC filter was used as it resulted in a compact and high performance circuit.

Connections to and from the filter and quadrature network are configured so that they can be switched between receive and transmit modes, thus allowing the same circuits to be used for transmit and receive. This reduces the number of adjustments required at the expense of additional switching, but this was considered preferable to using separate networks for receive and transmit.

Note, that as the phase and amplitude response of the I and Q channels need to be well matched, 1% resistors and matched capacitors were used in the corresponding places of the signal path in both channels. Generally the absolute value of the components is not as critical as matching the values and the process

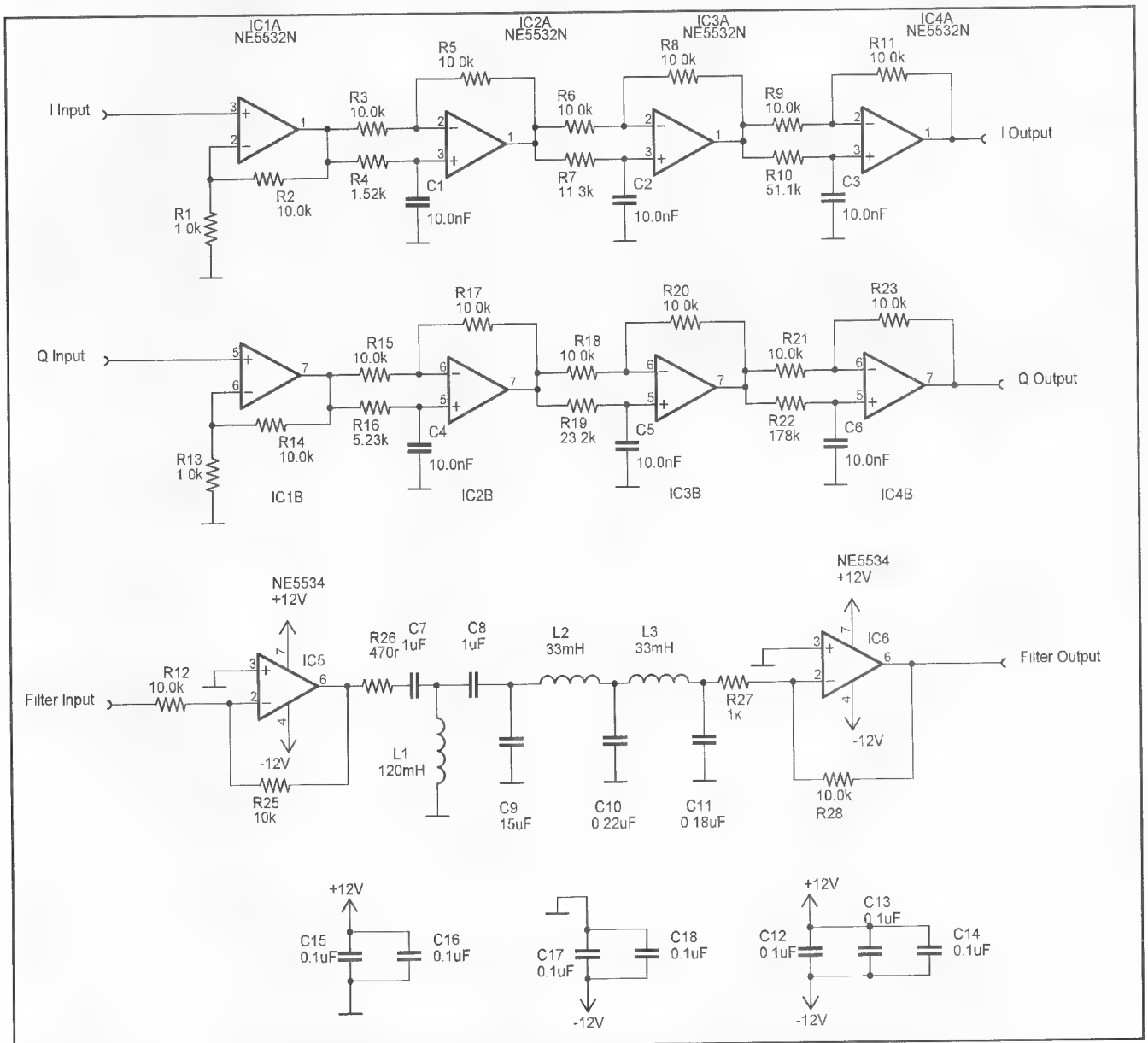

Figure 3: Audio band pass filter and quadrature network board. The connections to the I and Q inputs and outputs depends upon the mode of operation. The inductors are small PCB mounted units, see supplier information.

was simplified by purchasing 100 capacitors and selecting the values using a capacitance meter.

A small circuit board (see Figure 4) contains the loud speaker amplifier and tone generator. Originally the audio amplifier was mounted on the main PCB but it was impossible to make the receiver stable using such an arrangement; it was found that moving the audio PA to another board solved the problem.

The 'Twin-T' tone generator, switched on and off by the microcontroller; is used to generate the 'roger beep' signal as well as the Morse code signal when in CW mode. The tone signal is coupled to the loud speaker amplifier when in receive and to the second stage of the microphone amplifier when in transmit.

Radio frequency circuitry

The input signal passes through the main antenna changeover relay, then through a pair of rear panel miniature coaxial connectors. This was done to simplify connection to an external transverter. If this ability is not required, the pair of connectors and link cable can be ignored. (See Figure 5) The receiver signal is amplified using a MAR-8 MMIC.

These have a reputation for instability, however no problems were experienced in this design and the MAR-8 provides significant gain (30 dB) and a reasonable noise figure (3 dB). The input signal passes through a band pass filter made up of two toroidal inductors which are coupled by a small value capacitor. This band pass filter sets the RF bandwidth of the receiver and no problems with out-of-band signals have been experienced so far.

Following amplification, the signal passes through a relay and into the first mixer where the 144 MHz signal is mixed with a variable 28 MHz local oscillator (buffered by a MAR-4 MMIC) to produce a fixed frequency output at 116 MHz. The first mixer is a Mini-Circuits TUF-1 device which is available at low cost.

Another suitable mixer would be a TUF-2 or SBL-1 or similar, although the PCB layout would need to be changed to accommodate the different mixer package if the SBL-1 is used.

When in transmit mode the 116 MHz signal is 'up-converted' by the first mixer and switched through to a 144 MHz band pass filter and them amplified by two MAV-11 MMICs. These provide sufficient gain to develop several milliwatts at the output of the PCB which can be connected to either a transverter or to the local power amplifier stage.

To ensure stability, it was found necessary to switch DC power between the input and output amplifiers, otherwise there was a tendency toward oscillation due to the high gain and close proximity of the various RF amplifiers.

Transmit and receive signals at 116 MHz pass through the second mixer board (see Figure 6) where the process of direct conversion takes place. This board also contains the 116 MHz oscillator and RF quadrature network.

A conventional Colpitts JFET crystal oscillator and buffer amplifier drive a matching network (C9, C10 & L3) which matches the drain load of Q2 (~ 500 ohms) to the 50 ohm impedance required by the phase quadrature network. The MAV-11 MMICs have input and output impedances close to 50 ohms which matches the impedance required by the phasing network and second mixers.

Phasing networks come in all sorts of topologies. In this case a pair of eighth wave transmission lines and coupling capacitors provides two outputs with a quadrature phase relationship (see Figure 7).

Ideally the input power splits evenly between the two outputs and this seems to occur in practice. The two capacitors (C11 & C12) are required to have a capacitive reactance of 50 ohms at the wanted frequency, in this case 27.44 pF, so trimmer capacitors were used and adjusted to optimise the phase difference between the two outputs. Any amplitude difference can be later corrected by the amplitude trim adjustment on the audio processing board.

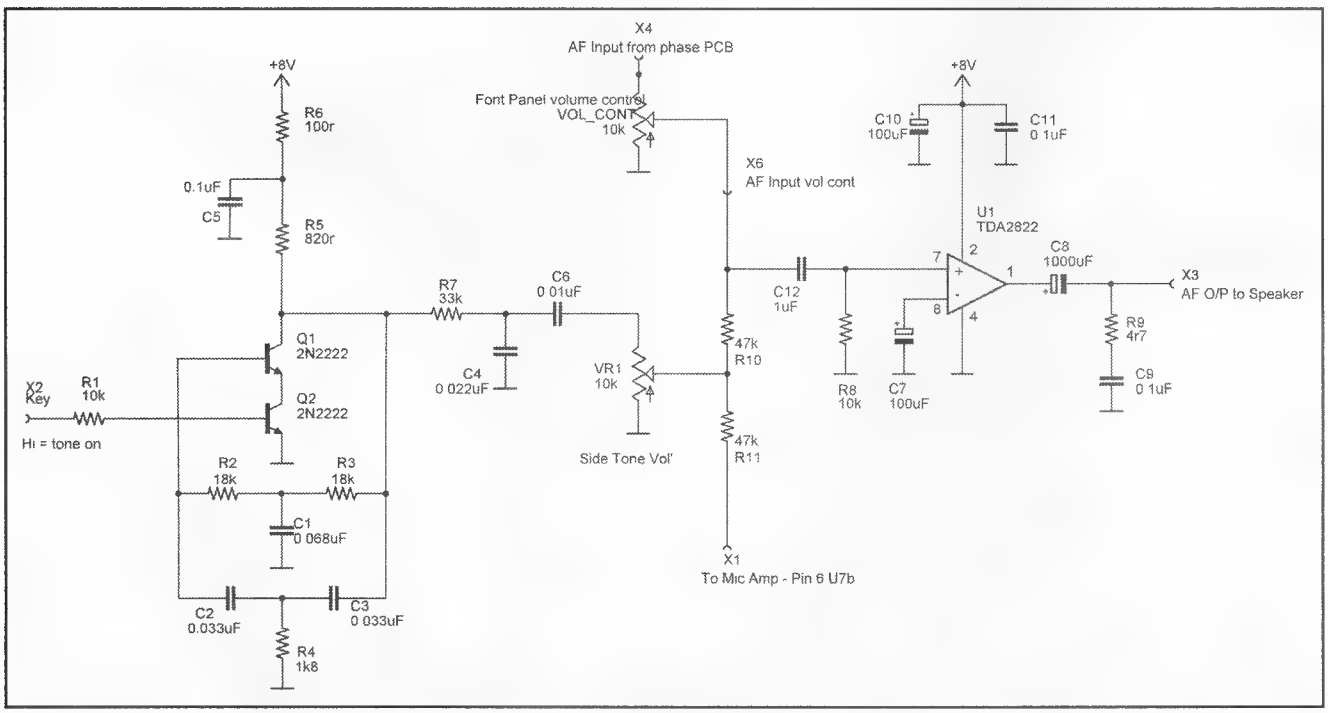

Figure 4: Loud speaker amplifier and tone generator.

The eighth wave lines are cut from a length of miniature coaxial cable (RG174 or similar, ideally Teflon insulation so that it can be soldered without melting the insulation) with an accurately known velocity factor.

It is very important to accurately know the velocity factor as the cable has to be cut to exactly one eighth of a cable wavelength at 116 MHz. In the prototype this amounted to a length of 210 mm based on a velocity factor of 0.651. Figure 8 shows the method I used to measure the velocity factor. Other methods could be used e.g. a grid dip oscillator or vector impedance meter etc, if this is more convenient. I used a signal generator to excite the cable and the frequency was adjusted until a sharp null was observed on the power meter (a suitable receiver could also be used). At this point the frequency was measured and the free space wavelength calculated. The length of the 'half-wave' section was measured and the velocity factor was calculated (remembering that the cable is *half* a wavelength long, therefore the length has to be multiplied by two) using:

$$\lambda_{fs} = \frac{C}{f} \qquad (1)$$

$$V_f = \frac{\lambda_c}{\lambda_{fs}} \qquad (2)$$

Where:

λ_{fs} = free space wavelength (m)
λ_c = cable wavelength (m)
f = excitation frequency (Hz)
C = speed of light (use 3 x 10^8 m/s)
V_f = ratio of phase velocity in cable vs. free space – always less than 1.

The eighth wavelength lines can now be cut from the coaxial cable. If this procedure is carried out carefully, the output from the quadrature network will have the accurate 90 degree phase difference required.

This process will work for any frequency so cable phasing networks can be built for any desired frequency,

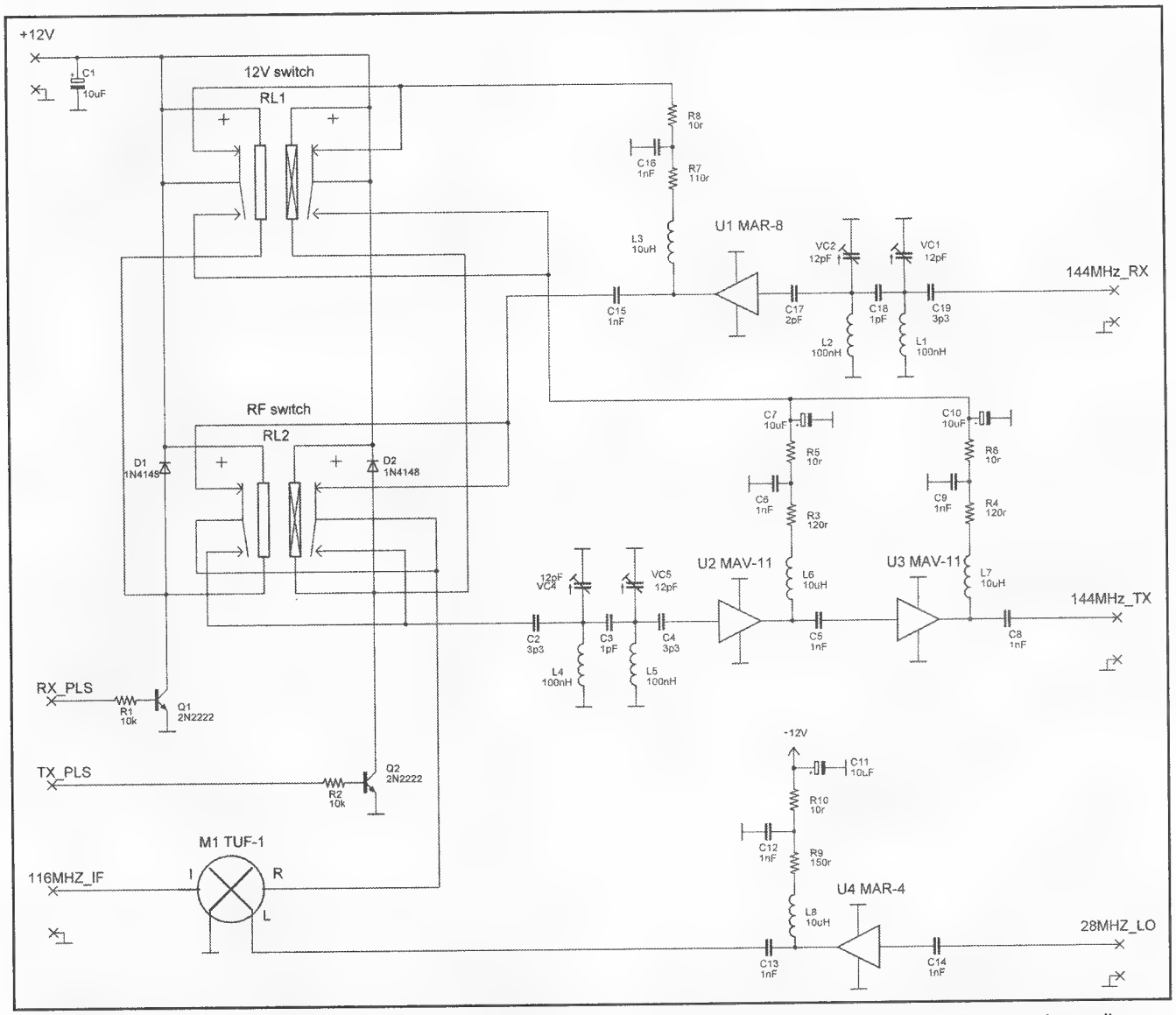

Figure 5: First mixer board. Inductors L1, L2, L3 and L4 are 6 turns on Amidon T37-12 cores. The MMIC output decoupling inductors are 10 uH SMD devices. Most of the other resistors and capacitors are also SMD components, although leaded varieties would work well, particularly if use at lower frequencies is intended.

remembering to change the capacitors so that they have a reactance of 50 ohms at the desired frequency.

The cable can be coiled up to save space without affecting performance of the phasing network.

After amplification by the two MAV-11 amplifiers, the two 116 MHz local oscillator signals are passed to the two mixers. TUF-2 mixers were used in this instance. Initial work was done with the more readily obtainable TUF-1 devices, but TUF-2 devices were obtained which improved the carrier suppression by several dB. However, TUF-1 devices would be very suitable for use at lower frequencies.

The signal at the final output frequency can be applied, at low level, to any suitable transverter, or it can be amplified for use at 144 MHz.

A three stage linear power amplifier provides enough gain to develop about 3 watts of output power, an overall power gain in excess of 30 dB (see Figure 9). This design was adapted from a circuit shown in Reference 3.

Following a double tuned circuit is a conventional feedback amplifier stage followed by two stages of power amplifiers. Both stages are impedance matched to the previous stages using either transformers or LC matching.

The final power amplifier bias is supplied by an emitter follower (Q4), the base input voltage of which is developed across two silicon diodes which are mounted, one each, on the bias generator and RF output transistor.

This ensures that the bias voltage is reduced as the amplifier heats up during use, thus avoiding thermal runaway. The

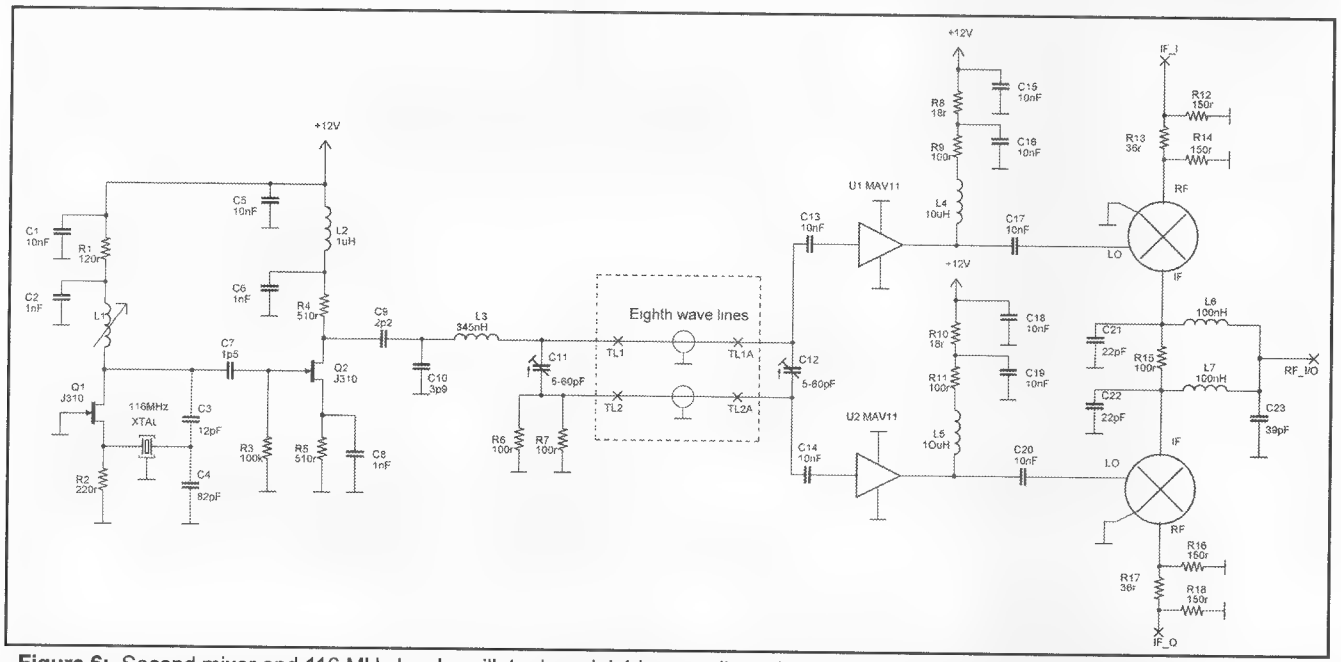

Figure 6: Second mixer and 116 MHz local oscillator board. L1 is a small moulded inductor with 5.5 turns and aluminium core – TOKO S18 green or equivalent. L3 is 15 turns wound on an Amidon T37-12 core (green-white). The other inductors are small SMD inductors. With the exception of L1, L3, Q1, Q2, XTAL, C11, C12, M1 and M2 all the components on this board are surface mount types.

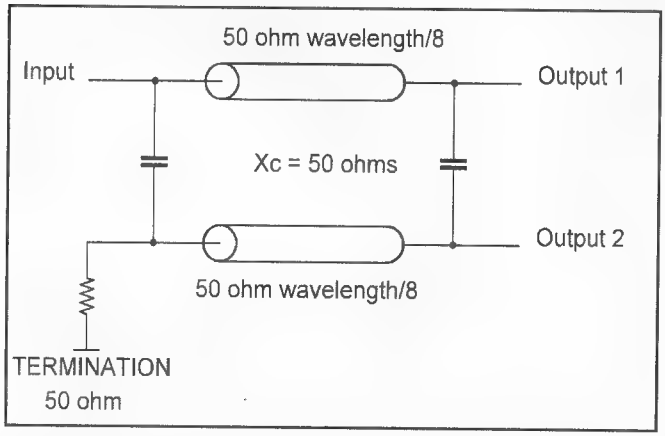

Figure 7: Eighth-wave quadrature network. Taken from Reference 2 which also gives a lumped component version for frequencies where coaxial cable is inconvenient. Reference 1 also has variations on the same theme, with cascaded versions offering quite wide bandwidths. In all cases the feed and termination impedance must be a close match to 50 ohms, or Z_o if some other impedance is selected for the design.

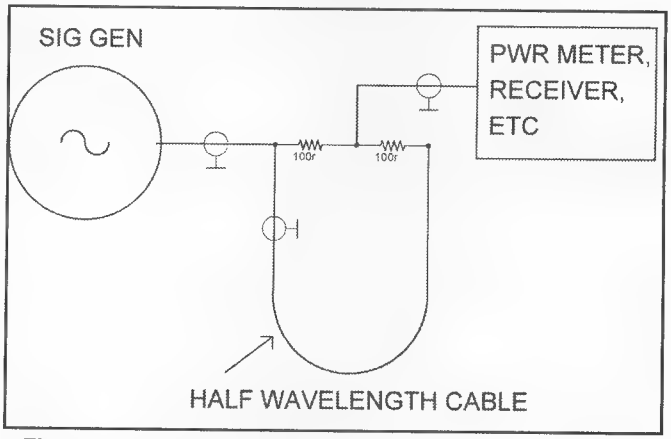

Figure 8: Method of measuring cable velocity factor. Accurate measurement of the excitation dip frequency and cable length is critical. The null should be quite sharp and deep. Incorrect measurement or calculations will impair the transceiver sideband suppression. The half wavelength can be any convenient frequency, and then the cable can be cut to the required eighth wavelength at 116 MHz.

quiescent current for the final amplifier stage is set by the trim pot R8 and the pot is set so that the quiescent current in Q3 is about 50 mA.

Power to the power amplifier is switched through the T/R relay controlled by the microcontroller and a rear panel toggle switch can disable the power amplifier when required.

This ends the first part of the article. The next instalment will describe the rest of the circuitry, construction and adjustment procedures.

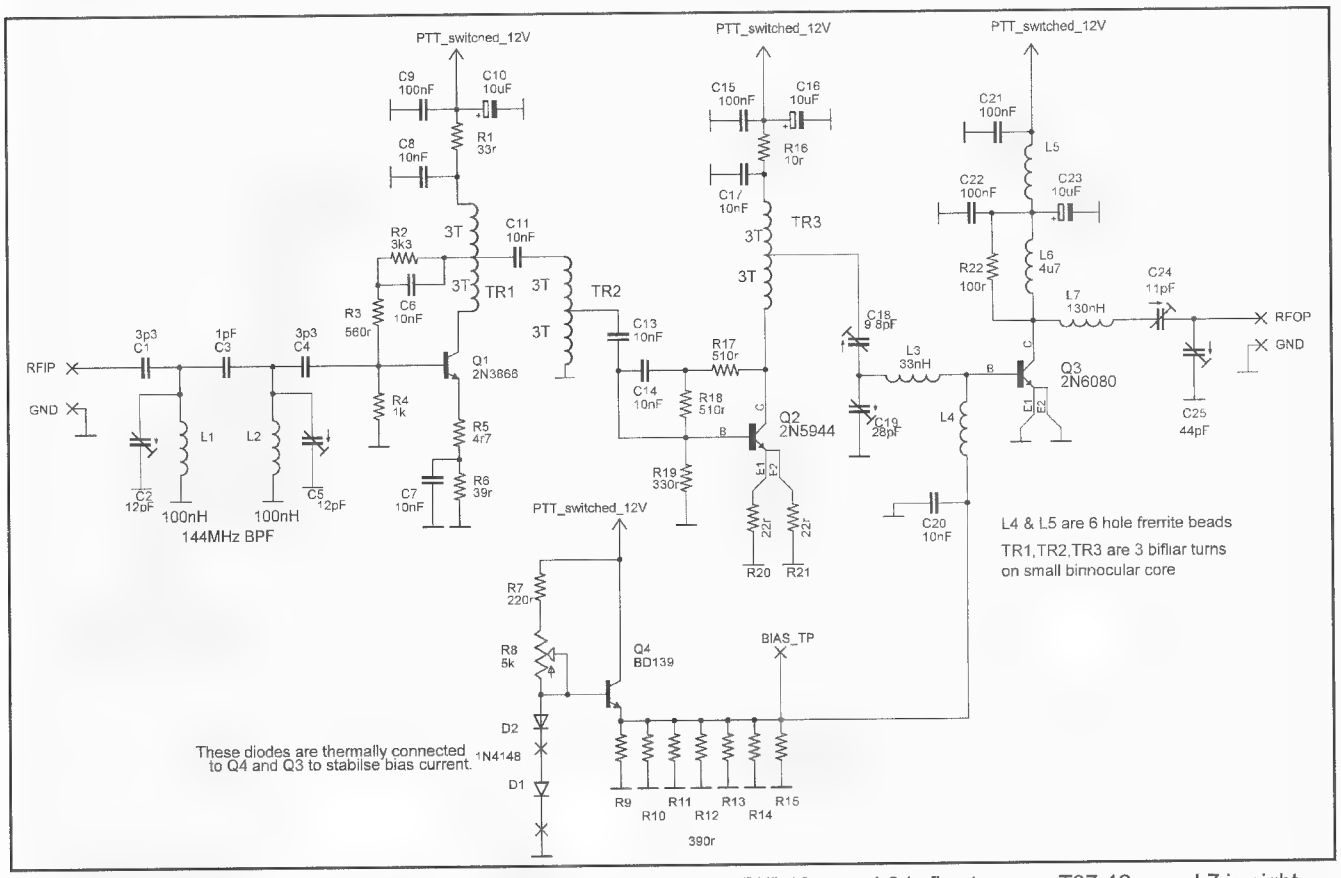

Figure 9: RF power amplifier. L1 and L2 are six turns on an Amidon T37-12 core. L3 is five turns on T37-12 core; L7 is eight turns on T50-12 core. Transformers TR1, TR2 and TR3 are three bifilar turns on small binocular ferrite cores (ex-equipment), L4 and L5 are chokes using six-hole ferrite beads (ex-equipment). Diodes D2 and D3 are glued to transistors Q3 and Q4 to ensure good thermal contact. The other passive components are a mixture of leaded and SMD parts. The values shown for the variable capacitors are the calculated values, so trimmer capacitors are used to allow adjustment to the correct value.

Silent Keys

Bernie Burgess VK4IB

I am sad to inform you of the passing of Bernie Burgess VK4IB on the 24th of June at Hervey Bay in Queensland after a long illness.

Bernie started life down here in VK7 and was known by many amateurs here in VK7 and will be sadly missed.

Vale Bernie.

Submitted by Kevin Burgess VK7BK

John Serino VK7UJ

I am sorry to tell of the death of John Serino VK7UJ following a period of poor health. He was 78 years old.

John was born in Italy and became interested in radio as a teenager, obtaining his amateur licence with the call I1UJ. Some years after moving to Australia, John passed the Australian exam and obtained the call VK7UJ. He was an enthusiastic Morse operator and after his first year as VK7UJ, he told me that he had talked to a 9 year old, a 90 year old and to someone sending Morse with his foot.

Vale John

Submitted by Richard Rogers VK7RO)

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ALARA

Aysha Venugopal VK5FASH

Two rare, faraway events

In a month's time, the YLs of Scandinavian Young Ladies Radio Amateurs (SYLRA) are going to embark on a rare polar DXpedition to Svalbard. SYLRA is hosting this rare treat due to popular demand of the YLs as a finale to the SYLRA 2009 meet at Kolbotn near Oslo (Norway) from 3-6 September 2009. The special call sign for the meeting at Kolbotn is LA1SYL.

For all the intrepid and interested amateurs who will be attending the SYLRA, Svalbard is a rare DX as it is the northernmost part of Europe. The polar expedition to Svalbard will begin on 7 September after the meeting has ended.

For all those keen amateurs waiting to get through to this DX, this is a rare opportunity as the last expedition to this site was the Polar YL meeting 1998 at Longyearbyen, Svalbard. (This is the northernmost town of over 1000 residents in the world, being 12^0 north of the Arctic Circle-Ed) Over the last 10 years, the accommodation and facilities in Longyearbyen have changed and the 2009 expedition promises to be a great opportunity.

The special call sign for the Svalbard expedition is JW1SYL and the YLs are going to be active from 3 am on 7 September till 11 September 2009. So for all those desperate for a QSL card from JW land, this is an opportunity not to be missed. The YLs will be on the radio round the clock.

Any amateurs participating in this DXpedition who wish to use their own call sign must provide their own QSL cards and bring their own log. The call sign that one can use would be JW/... and their own call sign. Good luck to those going on the DXpedition and those wanting to confirm JW in their logs.

The British Young Ladies Amateur Radio Association (BYLARA) is organizing a National Hamfest to celebrate its 30th Pearl Birthday Bash. The Hamfest is being organized on 2-3 October 2009 at the Newark Showground, UK. Amateurs can find themselves a good bargain or just bring and buy. For more information about the event, look up **www.nationalhamfest.org.uk**

Contests

It is contest time in August with the two big ones – Remembrance Day and ALARA – ready to keep the YLs busy on the air. Keep the radio gear tuned and refresh yourselves with the rules and log books for these contests if you want to win something or just enjoy yourselves with a bonanza of active contacts.

The Remembrance Day contest is the first big one and happens on the 15th and 16th August 2009. It is a 24-hour contest beginning at 0800 UTC Saturday and ending at 0759 UTC Sunday. Amateurs in VK, ZL and P29 areas try to notch up contacts in areas other than their home base. The contest is across all bands (except WARC). Recently, the contest has seen a number of enthusiastic F calls participating in the contest. This year, there is a new "receiving only" category for any licensed stations.

For any keen contester, keeping the logbook is a must, be it manual or electronic. Of course, electronic logging software (details in the July issue) has advantages over a manual one, especially when it comes to alerts about duplicate contacts on the same band within the two-hour time bar.

However, a manual logbook can also be submitted. You either buy a logbook from your local radio club or the WIA or just make up your own sheet with the rows for contacts and columns for date, time, band, other call sign, your signal and number, other signal and number and name of operator.

Full rules on page 42.

The ALARA contest and the ALARA award

For the YLs, the ALARA contest is a special time. The contest is held on the last full weekend of August and this year, it falls on Saturday 29th and Sunday 30th of August 2009.

The contest runs for 36 hours beginning on Saturday at 0600 hours and continues till 1159 UTC on Sunday. This gives a chance for members to use the two evening sessions to make contacts on the 80-metre band.

As there are not many ALARA members, they are allowed to make repeat contacts after every hour. In the contest, YLs get to work everyone while clubs & OMs work YLs only

There is a special prize for those who

make a note of every ALARA member contacted as they fetch top points in the final tally. What is better is that they can also get you a coveted ALARA award to decorate your shacks. The certificate costs only $5 or four IRC or International Reply coupons that can be bought at a post office. For VK and ZL call signs to qualify for an ALARA award, all you need to do is get 10 contacts from ALARA members from at least four call areas. As a DX amateur, you will need only contacts with five ALARA members from three call areas to qualify.

To claim your certificate, all you need to do is write out your list of contacts including details of date, time, band used and signal reports exchanged. The contact details along with the payment and your own address has to be sent to Kathy Gluyas VK3XBA using the call book or emailed to her at *kathyg@spacelink.com.au* She will print out the certificates, have it signed by the president and will mail to you. It is as simple as that and it is a great way to keep those contacts and certificates coming in.

Full ALARA Contest Details
on page 42 or at
www.alara.org.au

Happy Birthday ALARA

It was ALARA's 34th birthday at the end of July and clubs organized their own birthday luncheons to celebrate. An on-air party was held on the 80-metre band on 25th July 2009 with the annual Birthday Net from 1000 to 1200 UTC. Hope you all had a wonderful time and there will be more about the birthday lunches in the next issue.

ar

(Standing from left) ALARA members Myrna VK5YW, Jeanne VK5JQ, and Christine VK5CTY, with (sitting from left) Christine's granddaughter Bianca, her friend Donna and Jeanne's daughter Erica, Meg VK5YG and Jenny VK5FJAYat the ALARA monthly meeting in Adelaide.

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Amateur radio 1948

John K Carter

Just after the war, and before all the UK troops had been withdrawn, I was stationed in Padua, North Italy and was at the time the Wireless Officer at GHQ Central Mediterranean Forces.

Under an arrangement between the UK Postmaster General and the War Office, the Chief Signals Officer of a theatre of operations could issue a licence to a suitably qualified person to open and operate an amateur radio station, operating under the rules for such stations.

The call sign was issued to the station, not the authorised operator. Our station had the unusual call sign XAEK. There was another similar station, whose call sign I do not recall, operating in the Middle East Command.

The equipment was, for the main part, available military equipment not required for service use. The PA was built from service spares no longer needed, the output valve being an Eimac 100TH, grid modulated. The exciter stage was a Type 10 transmitter. For a receiver we used an RCA AR77. Next to the receiver was the mandatory frequency meter, a Bendix BC221, as I recall. For antennas we used '8JK' beams.

The author at the controls of station XAEK, circa 1948.

Regrettably I could not bring the station log with me, as it had to remain with the station for the next duly authorised operator. Some of the call signs I can recall working were VK4VD in Rockhampton, W6VTO fixed portable C1 in Shanghai China and LU6AJ in Argentina.

After the War, I retained my interest in amateur radio with a call sign G3EBM, followed by VK2APO and VK5LA. Residential restrictions prevented me operating in West Australia until recently, and I am now in the process of renewing my licence for a VK6 call.

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Telegraph codes in Australia

John Alcorn VK2JWA

With a background of different Crown Colonies federating into one nation it is not surprising that Australia's communications history has some oddities. Every Australian schoolchild knows of the different railway gauges, but different varieties of what is generally known as Morse Code?

IN 1853 an Irish-Canadian by the name of Samuel McGowan came to Melbourne with some telegraph equipment. He intended to operate a telegraph company between Melbourne and the gold diggings.

The State of Victoria then constructed the first telegraph line from Melbourne to Williamstown in 1853. The contract was won by McGowan, opening in March 1854. His operators, of course, used the American Morse Code. They handled 4000 telegrams in the first year, mostly shipping information.

Tasmania constructed a line from Hobart to Launceston in 1857, connecting by undersea cable to Melbourne in 1859. Sydney, Melbourne and Adelaide were linked by Morse in 1858.

American Morse was adopted in the eastern Australian States, and from 1862 this was also adopted in New Zealand as 'Victorian Code'.

Brisbane was connected to Sydney in 1861, and their lines extended northward.

When the Overland Telegraph line from Port Augusta, South Australia, to Darwin was opened in 1872, American immigrant operators got the job, and used American Morse.

However in 1874 Victoria adopted its own version of the Code eliminating the spaced characters C O R : ; . but retaining Y Z &.

Why? Who knows? This was known as the Victorian Code.

In Western Australia the Telegraph was constructed and operated by the West Australian Telegraph Co. in 1869 using their own WATCo Code, which was different from the others.

South Australia and Western Australia were linked across the Nullarbor Plain by 1877. By the way, 'Nullarbor' is not an Aboriginal word, but a corruption from Latin 'null arbor' which translates to 'no trees'. They met at Eucla, a small coastal settlement 12 km from the WA-SA border, inside WA.

Eucla Telegraph Station became a very unusual office, operating with up to 70 staff.

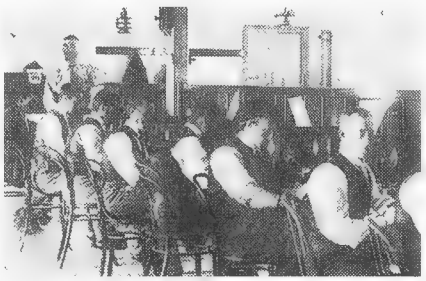
Basically it was a long building divided by a wall up the centre, with operating benches on each side and with windows or pigeon holes between. WA operators sat on one side and SA operators on the other.

WA traffic in WATCo Code was received, written out and passed to SA operators who sent it on in Morse (or Victorian) Code. I do not know if any other states adopted Victorian Code. The reverse happened to traffic the other way.

The transcription service ended after 1897 and Eucla Telegraph Station closed in 1927.

The webpage for the Eucla Telegraph Station can be found at http://members.iinet.net.au/~oseagram/eucla.html

The Intercolonial Postal and Telegraph Conference in Sydney in November, 1896 decided that the International Code would be adopted by 1 July 1897. Operators had about three months or so to learn the changeover. This happened,



Telegraphists at Eucla – on one side of the dividing wall.

Victoria doing so on 1 August 1897. The rest is history.

The longest direct telegraph line constructed in Australia was 3220 km (2000 miles) from Perth to Wyndham, WA.

Morse telegraphy was last used in Australia between Roebourne and Wittenoom Gorge in the north-west of Western Australia, on 5 November 1968. The traditional telegram service ceased in 1989. Now 'telegrams' are sent as specialist services by authorities by other means, or by Morse enthusiast groups using code.

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ARK's Academy

John Fisher VK3ARK

Approximately a year ago a small group of Melbourne amateurs began to consider what they could contribute to the hobby in the area of education.

Introducing ARK's Academy

The action to examine education resources came about due to a lack of upgrade courses being offered and also some concerns with regards to the costs involved and the increases in the WIA/ ACMA fees.

It was decided to form an organization that would offer courses free of charge, thus ARK's Academy was born.

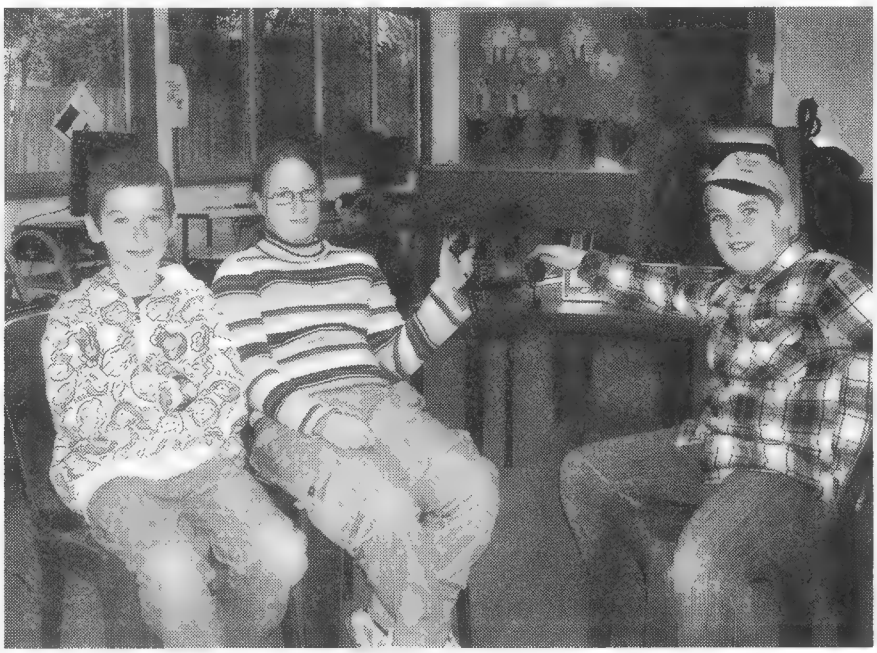
With the generous support offered by the Sherbrooke Community Radio Club, which is based at the School in Sassafrass, planning started to run a couple of Foundation courses initially as a trial for a number of students and staff at the school but growing to include any person wishing to attend.

The rest is history. With a number of Foundation courses behind us and our very successful Regulations course where all seventeen candidates passed their exams, and one candidate, who decided on the spur of the moment to try, passed his Standard theory exam, we have gone from strength to strength and our upcoming Standard theory exam is fully subscribed with over twenty five candidates registered to attend.

All courses are free and there is no obligation to join any radio club as a requirement to participate (we do however pass around the hat for tea, coffee and snacks). Courses are conducted in our modern well equipped classroom.

At about Christmas time classes will move into a new purpose built auditorium that is being constructed and this will also be the venue for our regular Sunday Technical Seminars which will be followed by lunch and an opportunity to use the facilities in the SCRC's well equipped radio shack.

ARK's Academy Instructor Lino VK3BAD has done a fantastic job in developing new training material for ARK's Academy. Lino is ably supported by course instructors Ivy VK3IVY, Hannah VK3GNU, Jim VK3AMN, and John VK3JRB, and we invite any amateur who would like to join us in helping others enter the hobby to contact



James VK3FJAM, Monique VK3FPWZ and Callum VK3FSDP attended ARK's Academy to get their Foundation licences.

me John vk3ark@wia.org.au Note that you must be able to obtain a Working with Children card, but we can help with this paperwork.

Our next Foundation course will be conducted over the weekend of 5th and 6th of September at Sassafras.

Courses planned for 2010 include five Foundation courses starting in March, a Regulations course, a Standard theory course and new for 2010 we will offer an Advanced theory module to compliment our Standard theory course. Dates of courses will be published on VKHAM.

Best 73 John Fisher
VK3ARK/VK3DQ/M0GJF
VK3ARK@wia.org.au
VK3DQ@wia.org.au

ar

Candidates came from far and wide for the regulations course with Peter VK3FBEN travelling from Shepparton to Melbourne to attend.

Get on the Air

Some great contests and events coming up

Remembrance Day Contest

15/16 August
"Call for your State"

ILLW Event

15/16 August
"Great Contacts Great Sites"

ALARA Contest

29/30 August
"Meet many YLs"

Westlakes Cup

19 September
"Super Sprint"

All Contest details page 41

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See the web site for more info and a complete dealer list.

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Tet-Emtron Vertical Range

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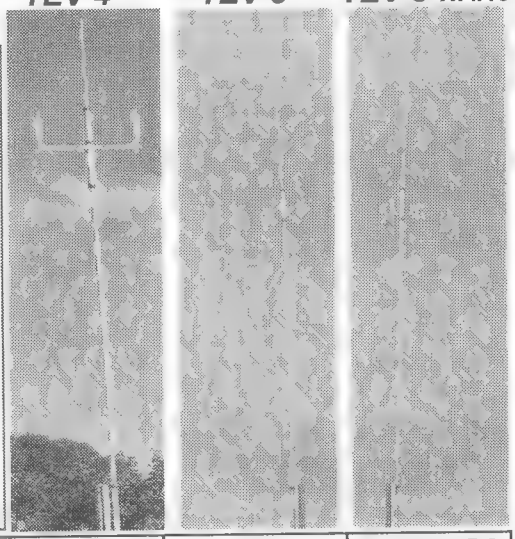

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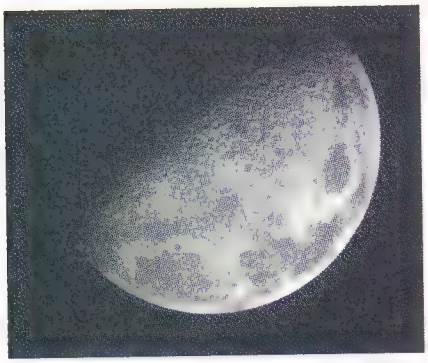
Echoes of Apollo - EME on three milliwatts!

Rex Moncur VK7MO and Justin Giles-Clark VK7TW



June 27 2009 was designated World Moon Bounce Day as an amateur radio contribution to the celebrations of the 40th anniversary of man's first landing on the moon. The event was organized by a US group of amateurs who had access to the Stanford University 45 metre dish and they sought the involvement of some of the larger radio astronomy dishes around the world.

A key objective was to involve and interest school children in science and amateur radio by allowing children to hear voices from the moon. The event was supplemented by amateur Earth Moon Earth (EME) stations all around the world and particularly those with SSB capability on 23 cm.

Within Australia, the University of Tasmania (UTAS) agreed to take part using their 26 metre dish. Originally used by NASA in the Orroral Valley near Canberra between 1964-1985 it was gifted to the University and transported to Mt Pleasant, near Richmond in southern Tasmania (See cover picture).

Our involvement was to provide amateur EME equipment, help set up and test the system and operate the station on the day. As it eventuated the availability of large dishes provided the opportunity to explore QRP EME at as low a level as possible and we are pleased to report completion of a JT65 EME contact between the University of Tasmania's 26 metre dish and a Dutch 25 metre dish, PI9CAM, with the Tasmanian end running only three milliwatts.

Setting up the University of Tasmania dish

Dr Jim Lovell, of the University of Tasmania (UTAS), willingly offered the UTAS dish and the support of the site technician Eric Baynes (VK7BB), but it was first necessary to consider what was practical.

At our first meeting it became clear that transmitting any sort of high power as required for SSB would be out of the question as the dish is fitted with five extremely sensitive liquid helium cooled receivers working from 4 to 22 GHz (Figure 2).

There is no protection for RF and we could not risk damage to these receivers which are involved in ongoing international research programs. Accordingly, the Echoes of Apollo team were advised that we would contribute to the event but as a receive station only.

The feeds and receivers for the 26 metre dish are mounted in a small feed cabin (a cube approximately two metres per side) behind a Teflon window about one metre in diameter. In the cabin there is a remotely controlled three axis focus frame that allows the feeds and receivers to be moved into the correct focal position depending on which feed is in use. There is space for a two GHz non-cooled feed and receiver which fortunately was not required around the time of the Echoes of Apollo event. The University agreed that this be removed and replaced with a 23 cm antenna. Because of space limitations it was decided to use a small three turn helical.

As there is over 100 metres of LDF-4-50 coax between the dish and the control building where we could operate we decided to down-convert at the feed and receive on 144 MHz. Eric constructed a down-converter and the VK7MO EME station provided pre-amplifiers, 144 MHz receiver, GPS frequency reference, computer running WSJT and bandpass filters at 1296 MHz and 144 MHz to limit interference from microwave systems at the nearby Hobart airport.

Prior to the event tests were conducted with Dave VK2JDS, with JT65c signal levels much worse than expected at -9 dB and no prospect of copying SSB. A sun noise test gave around 18 dB compared to 27 to 28 dB determined with the VK3UM EME calculator.

The time for testing was limited as this is an operational radio astronomy

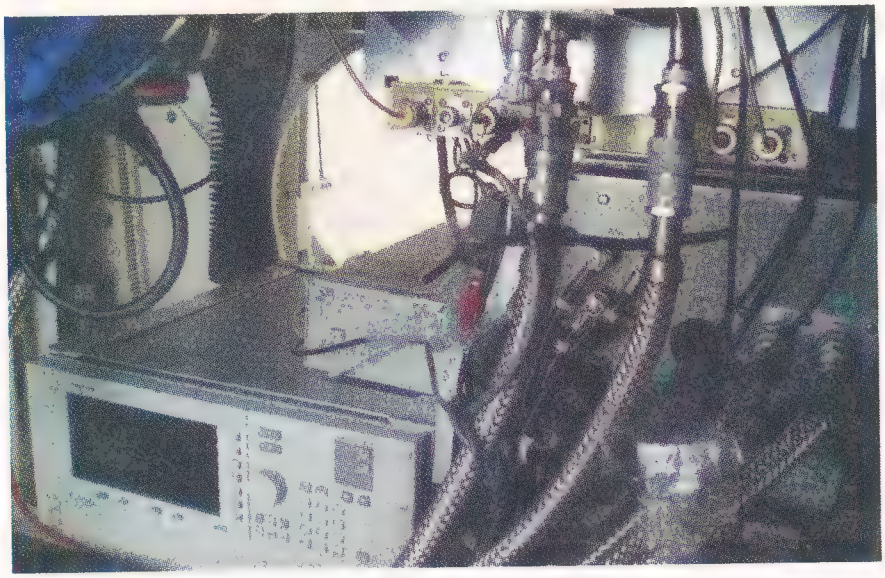


Figure 2: Liquid helium cooled receivers.

research facility but the system was gradually refined with additional pre-amps and filters and through adjusting levels at all stages – as well as resolving the occasional "Murphy" problem.

Finally we decided that the helical feed must be the remaining limitation and did some estimates to see if a Septum feed and choke ring could be physically mounted. Initially it fouled other equipment but after a redesign of the mount it was successfully installed. In the end we achieved a sun noise of 25 dB which was within a few dB of what could be expected. Every time the system needed adjustment Eric had to don a safety harness and go up in a cherry picker (Figure 3).

Tests were now conducted with Doug VK3UM, who runs 400 watts and an 8.6 metre dish. Doug's SSB came through at 5/6, sufficient to be heard in a room filled with children – so with just four days to go we reported to the "Echoes of Apollo" team we were ready to go.

Could we transmit QRP?

With the RX side resolved our minds turned to the possibility of transmitting QRP at a few tens of milliwatts to avoid any possibility of damaging the radio astronomy receivers.

A quick calculation suggested that we should be able to work the 25 metre Dutch station PI9CAM at less than 10 milliwatts using JT65 and after an email, Jan PA3FXB told us they would be delighted to try JT65 at 10 milliwatts. While we did not have time to test the system until the day of the event, WSJT echo testing on the day gave a signal level of -31 dB at 10 milliwatts and this was improved to -27.8 dB by careful adjustment of the focus of the feed.

The day of the Event

Because of uncertainty about working the Stanford group with SSB at an adequate level for a room full of children the university decided not to actively advertise the event to the public but agreed that we could advertise on the VK7WI broadcast for amateurs to come along with children and friends. Our first reception was from Doug VK3UM at 5/7 who we worded up by telephone to talk to the children. It was a joy to see the smiles when they heard their names off the moon. While as amateurs we could copy Dave VK2JDS on SSB at 5/2, it was not quite strong enough for the children to resolve the voice, but using JT65 messages, Dave produced a great reaction from the children who photographed their names coming back from the moon. (see table below.)

The Stanford group was received at around 5/7 for a short period but then had to remove their feed to repair a pre-amp. Later we had various children and the media visit and arranged for Doug VK3UM to be the voice from the moon with great effect.

As the European window opened we could copy Dan HB9Q on his 15 metre dish calling CQ on JT65c at -1 dB. The university technician agreed we could up power to 30 milliwatts and Dan responded to our call giving us a -23 dB report. Power was then reduced to 10 milliwatts and with some effort we again completed with Dan at -29 dB. It is noted that given the 18 dB isolation of the Septum feed we did not need to use a TX relay as 18 dB down on even 30 milliwatts is quite safe for a low noise pre-amp.

Continued with photographs on inside back cover

JT65 message pro forma print out of names that went to the moon

TIME	SYNC	dB	DT	DF	W	Decoded Text		
082700	7	-10	0.2	38	10 *	HI JESSICA	1	0
082800	8	-8	0.1	30	11 *	HI NICOLE	1	0
082900	9	-9	0.2	19	11 *	MOON ECHOS	1	0
083000	6	-9	0.3	8	10 *	MOON ECHOS	1	0
083100	9	-7	-0.3	-5	10 *	HAVE FUN	1	0

Figure 3: Access to the feed cabin is by cherry picker.

Figure 4: Control room view.

An echo of 'Echoes of Apollo': the 'SSB Fun event'

Doug McArthur VK3UM

There was considerable excitement in the early stages of the planning of the 40th anniversary of the landing on the Moon with the possible activation of Honeysuckle Creek, Parkes and other notable installations.

The weekend of 26/28 June was originally chosen (it was a month earlier than the Apollo 11 landing) to allow the Honeysuckle Creek dish to acquire the Moon. It is mechanically limited to elevations above 25 degrees and thus a weekend of low declination (Moon high in the Southern sky) was chosen.

As the time approached it appeared that many of the plans were not going to happen so, as a supplementary activity, I put it to the EME fraternity that we stage a *SSB Fun Net* to concentrate as much activity as we could muster and to support the event. It was hoped that children and other interested parties would be attracted to several of the larger stations and the exercise would foster science and technology.

23 cm was chosen as this is where there is the most activity of SSB stations capable of communicating via EME. The idea quickly became a reality and support was received from all quarters of the EME fraternity.

We agreed to use 1296.025 MHz as our net frequency and chose windows that would maximize the time available via the Moon for each of North America (NA) to Oceania (OC), Oceania to Europe (EU) and Europe to North America paths.

It was also agreed that I (VK3UM) would act as net control for the NA > OC and OC > EU windows and Joe (K1RQG) would handle the EU > NA window. The main mode was to be SSB but smaller stations were encouraged to call on CW.

The activity was conducted on June 26, 27 and 28 and provided three windows on each day. The times worked out quite well and nobody needed to get up in the middle of the night as they fell in the late morning and early evenings.

A slight negative was that the Moon's declination was lower than the Northern Hemisphere operators would prefer and varied from +13 degrees on the Friday to -1 on the Sunday. In the Southern Hemisphere we had a 'rare' chance to work EME with the Moon a lot higher in the sky but many Northerners found trees and other obstacles hindering their path.

It was a resounding success! I had over 60 SSB QSOs via the Moon during the activity periods, something even 10 years ago would have been just a dream. The smallest station I worked (all totally random and only two were 'CW support' calls) was a 2.5 metre dish and 50 watts. I am running an 8.6 metre dish and 500 watts at the feed. (ACMA 750 watt high power permit for 23 cm).

..(only) 2% of the power leaving your antenna actually hits the Moon, only 6.5% of that power is reflected and then 98% of that is lost getting back... (but) I had a three-quarter hour chat with HB9MOON where there were many school children...

I have deliberately under illuminated my dish providing a 15 dB edge taper to gain a lower noise temperature (technical stuff that would take a lot to explain!). Simply put, it hears darn well!

The individual stations worked (most with relative ease at Q5 up to S8) are listed below. The ARRL issued special call signs for the event as can be seen below.

W5HN, W5LUA, N6NB, AA6EG, K2DH, W1O, (K6MYC was first heard operating the Stanford dish before handing over to other members of the team). F2TU, OZ4MM, OZ6OL, JA4BLC, VK2JDS, G3LTF, VK5MC and SV3AAF, SP6JLW, HB9MOON, OH4DG, SM6FHZ, HB9US, HB9RJG, F2TU, LX1DB, G3LTF (again through his trees) and G4CCH, SV3AAF, W1O, N0O, JA8ERE, W7BBM, VE3KRP, W5J, SP6JLW, OH2DG, SM6FHZ, HB9US, HB9RJG, LX1DB, G4CCH, W1M, VE6TA, KD5FDX, K0C, RK3WWF, ES5PC and DF9QX.

Many of the above stations were worked each day and multiple way QSOs were had, which in itself was a challenge to net and track the Doppler shift.

I had a three-quarter hour chat with HB9MOON where there were many school children and amateurs present including the youngest YL in HB.

No we do not have any crocodiles at VK3UM, only koalas, kangaroos, wombats (free to a good home), echidnas and snakes (though I did not tell them that!). It was a fascinating chat and you could tell how excited the children were and how obsessed they are with our 'snappy handbags'. We later learnt they also had TV coverage and all manner of dignitaries on site.

Rex VK7MO kept up our side of the promotion by using the University of Tasmania 26 metre dish at Mt Pleasant, as reported elsewhere in AR. I greeted all the children present by their names (he told me via the phone; I am not that good!!). Rex tells me they were '*over the Moon*' in hearing their names called off the Moon over a path of 750,000 km at the time. Later we did a similar chat when a TV crew were present at the Mt Pleasant site.

I did not get the chance to chat with the Apollo 8 astronaut (Bill Anders), as the Stanford dish only came on once (on Friday) and did not appear in our other common windows.

Well after all this I was quite talked out, this SSB caper is just too much hard work, long may CW reign!

It really was a fun weekend and provided the promotional opportunity for one unique facet of our hobby.

It also served as a reminder of the brave pioneers that set foot on the Earth's distant Moon.

Continued with photographs on inside back cover

A case of simpler being better (and easier)

Felix Scerri VK4FUQ

A failed mast leads to a re-think on all sorts of 'simpler is better' solutions.

I like wire antennas, having built quite a few different types over the years. For 20 m use and general short wave listening duties I use a single one wavelength Quad Loop. For 40 and 80 m I use dedicated inverted V dipole antennas, all antennas being fed with balanced feeder as tuned lines.

Accompanying the arrival of our northern 'Wet Season', a period of severe weather saw my 12.5 m pipe mast fail after a night of sustained heavy winds. Seeing this pipe mast bent into two was not a pleasant way to start the day.

The mast held up my 40 m inverted V dipole. A shorter, 8 m replacement pipe mast was quickly assembled that afternoon and the 40 m inverted V dipole was placed back into service. I was gratified to note practically identical signal reports compared to the previous situation with the higher 12.5 m mast.

However after losing the mast I was keen to make a few changes, and, based on my success with my Quad Loop on 20 m, I decided to try and erect a one wavelength Delta Loop in place of the inverted V dipole for 40 m. Wire was purchased and a wire Delta Loop for 40 m was assembled and I commenced to place it on the replacement mast, configured as a triangle with the apex up. I was concerned about the possible reduced 'effective height' of the Delta Loop in this guise, but I thought its performance would be better than the inverted V dipole in any case.

After putting it up, which was done with only a moderate difficulty, I attempted to 'cut' the loop to exact resonance using a dip oscillator. This was where I struck initial trouble. No matter what I did I could find no 'dip', anywhere! I did a few checks with my trusty ohm meter, no breaks were found just the expected low resistance DC loop. More attempts to 'dip' the Delta Loop followed with no result! I was running out of day time so I quit for the day.

Next morning I resumed tests. I even trotted out my trusty noise bridge and a good receiver. Readings made no sense. I persevered for a while but then decided to cut my losses and forget about the loop altogether, and I put my inverted V dipole back up on the pipe mast, which was done without major incident.

As I do weekly WIA News broadcasts on 40 m, I wanted to see if I could improve my signal further although the 'reduced height' 40 m inverted V dipole was used the previous weekend with excellent results. I need not have bothered with the Delta Loop, as the inverted V dipole was working well! A lot of effort in the backyard for nothing!

Why I could not find a 'dip' with the Delta Loop continues to be a mystery. I suspect that a metal fence running close to and under the loop, and in the same line was probably detuning it somehow. In any case it did not really matter in the end. It was a case of something 'simpler' being better, and easier.

The experience taught once again that the humble inverted V dipole is actually an easily erected, excellent performing antenna. Being at a relatively low height may actually be an advantage in terms of improved local and semi-local coverage, my main areas of interest. Why bother with something more elaborate when there is no real point in doing so?

Shortly after this experience a similar scenario presented itself.

A three element Yagi that I had built for the VHF FM broadcasting band had also suffered some storm damage. I was going to rebuild it when I came across a design for a simpler, more compact two element Yagi for the FM broadcasting band claiming good performance. So using parts from my old Yagi, I built it and as claimed it worked very well.

Another example of the same sort of thing. The law of 'diminishing returns' applies! That is worth thinking about!

The damaged 40 metre inverted vee mast.

The current 40 metre inverted vee mast, 7.5 metres.

News From

Keith Bainbridge VK6RK

VK6

Welcome to the August edition, one that I thought might not appear this month. Then, at the last minute, input! Firstly news from the northwest.

Pilbara

Greetings all; not much has changed up this way since the last time we contributed. The numbers in the Pilbara have possible increased by one as Roger VK6FRAN was in the area many weeks ago, but without a radio.

He says that he will be prepared for two metres the next time he flies into Karratha. Unfortunately I have not heard Roger on our local repeater VK6RWR yet.

Speaking of our local repeater, it is moving! But only about 75 metres to the north. It is leaving our old rusty tower, which will be dismantled, to the local iron ore company's new, large tower.

Unfortunately we will gain no antenna height on the new tower, many other services have higher priority. But we will still be at 18 metres (60 feet). We do not expect any interruption to the repeater or the IRLP connection while changing over. With the change in location, the local hams will change the old trusty Philips 828 radio for a used but refurbished Uni-Lab KL150.

Michael VK6BHY and myself VK6HV are now on six metres SSB from the Pilbara, with minimal installations of 50 watts and vertical antennas. We continue to listen sporadically, but no contacts as of yet. **73 Steve VK6HV.**

Thanks Steve, I am sure there will be many looking for you on six metres as the conditions improve.

International Lighthouse/ Lightship Weekend

Once again Cape Naturaliste and Cape Leeuwin will be activated for the International Lighthouse weekend, on 15/16 August.

Nigel VK6KHD, with XYL Jane VK6FJPD and Bernard VK6FBRB will crew the light at Cape Naturaliste The Geographe Bay Tourist Bureau will put on extra attractions this year to help with marking the lighthouse weekend.

Wally VK6YS will man the Cape Leeuwin Light and is looking for help with operating over the weekend; anyone interested should contact Wally via our website www.westozdx.net

73 Nigel VK6KHD.

Southern Electronics Group

Hello all. Just to let you all know about some upgrades to the SEG repeaters that occurred Friday 19 June, during the sub-Antarctic weather conditions.

Bevan VK6BL and I went to Mt Clarence in Albany to re-install the VK6RAL 70 cm repeater and cavity duplexer in the hut. We also installed a large 12 volt 120 AH backup battery system to keep the repeaters on air during power outages.

The 70 cm repeater is now back on air on a new frequency, 439.950 MHz, with a -5 MHz offset. The 70 cm repeater is now permanently linked to the VK6RAA 2 metre repeater at Mt Barker, on 146.825 MHz, the new system giving coverage from Albany in the south to Kojonup and Katanning in the north. The audio across the linked system sounds very good.

After lunch we ventured up to Mt Barker and were joined by Wes VK6WX at the repeater site. We installed a new cavity duplexer on the VK6RAA two metre repeater as well as a large 12 volt 450 AH battery bank to keep the repeater on air during power outages. Unfortunately the Mt Barker weather was no better than Albany.

Signal reports are welcomed on coverage of the repeaters. Many thanks to all those who assisted with the project, in particular Kerry VK6NHI for reprogramming the 70 cm repeater and reworking both sets of cavities, Rick VK6XT for his donation of a large 12 volt battery and diodes, and Bevan VK6BL for his donation of the battery boxes and terminal clamps.

We have finally been able to confirm some dates for the next Southern Electronics Group (SEG) Foundation Licence Course. The course will be run on the weekend of 29-30 August 2009 at the Mt Barker Community College in Mt Barker. If you are interested, please contact me. There is also information regarding the course on the SEG website at http://www.hamradio.org.au Click on the 'Exams' link on the main page.

We will be able to conduct exams/ assessments on this weekend for anyone ready to upgrade their licence. If you have any further questions, please feel free to contact me. 73 RobVK6LD.

The repeaters in the south are certainly getting a new lease of life and many more projects are planned to further improve things down there. I will be in Denmark on the weekend of 19 July so will take a first hand look at the improvements.

NCRG

By the time you read this there will have been a very serious attempt on the IARU contest from Bernd VK6AA and Kevin VK6LW from the club premises. Both operators are in serious contention for bigger events in the future and need to get a good score over the weekend. As I write this, a week before the event propagation is not looking too hot, so hopefully the 'Gods of the Ionosphere' will have looked after them both!

The club AGM was held recently and the new committee is: President Wayne VK6EH, Vice President Neil VK6NE, Secretary John VK6JX, Treasurer Andrew VK6IA with the rest of the committee being VK6PY, VK6RK, VK6FJA and VK6TWJ. I wish the new committee success especially with the substantial increase in membership fees to align the club with the costs of running a top contest station and arguably the county's best club premises .

Hamfest 2009

Hamfest is on again, or may even have happened by the time you get this edition. The date is Sunday 2 August, at the Cyril Jackson Community Centre, Fisher St., Ashfield 6054. Hopefully you will not have missed the premier amateur radio event in WA. A full report will follow in next month's magazine.

That is it for this month. I hope to have seen you at Hamfest and had a chance to chat with you; any suggestions for the column will always be considered and then discarded!

Very 73 Keith VK6RK.

VK5

South Coast Amateur Radio Club – Half Yearly News.

The first half of the year has absolutely flown past, with the club achieving quite a lot over the months since the New Year began.

Prior to the club officially opening, there were members who were involved with the Summer VHF/UHF Field Day in January. Barry VK5KBJ, Stef VK5HSX and Andrew VK5LA participated in the contest, operating VK5ARC/P from Loud's Hill (PF94), where we received eighth place nationally and third in South Australia, with 2362 points.

When SCARC officially began, particular focus was on making sure the Club's radio shack VK5ARC was once again fully operational since the move from the old clubrooms, which were located at the Karawatha Hall in O'Sullivan Beach.

We had the task of relocating the tower, along with antennas, and so on when we moved back in 2007. However long negotiations with the local council were required before the tower installation could proceed. This took over 14 months before approval was finally received.

The club then worked flat-out on the installation of the antennas, coaxes and benches, before we could think of what radios we required. There are many people who need to be thanked; however there are too many to mention, I would like to thank everyone who was involved in helping to make the dream finally a reality. It would have not been possible without your contributions.

So keep a listen out for VK5ARC around the bands, which include 160, 80, 40, 20, 15, 10, 6 and 2 metres, plus 70 cm and 23 cm. The club also has a satellite tracking system installed, with thanks to Jim VK5JST for his construction efforts.

SCARC is moving forward by having its own EchoIRLP on its VK5RSC repeater 439.825 MHz (-5 MHz) where the IRLP Node #6278 and EchoLink Node #399996 are operational. We would like to hear you connect and say Hi.

There has been minor change with the Committee, with Dicky VK5PRD unable to make the meetings, exchanging with Stef VK5HSX as the fourth Committee member. We thank Dicky for his efforts and we realize the commitments needed for effective work, along with having a family at home with sporting clubs etc. Thanks again, Dicky.

The club organised various project nights, as well as guest speakers, which were warmly received. Topics included talks from Tony VK5ZAI (satellite communications), Dean VK5LB (linears) and Robin VK5ATT (WICEN). The various projects worked on included: Mitch VK5AZM (RF sniffer) and Iain VK5ZIF (UHF dummy load).

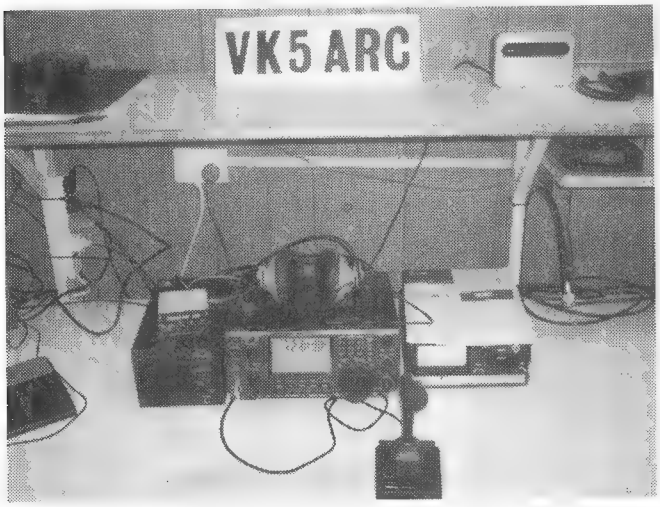
We also had a mid-year Dinner at the Christies Beach Hotel, which was well attended and thoroughly enjoyed by all. There are a few items already organised, or being organized, for the second half of this year.

If you have any requests for talks or project items for construction, then please contact a member of the Committee for consideration. Events that soon are coming up include: A demonstration on "Oscilloscopes" by Jim VK5TR on 15th July, "Gadget Night" on 19th August, 2009 AGM on 25th November and Annual Club BBQ 9th December. Thanks to Morgan VK5MMM for his efforts in securing guests and projects for members of the club.

The winter brings the Rally, which is coming up very soon. If you wish to participate in assisting with communications, then contact either RallySA http://www.rallysa.com.au or Dave Clegg VK5AMK by email (vk5amk@wia.org.au) to find out what is required.

Stef Daniels VK5HSX, Publicity Officer, South Coast Amateur Radio Club Inc.

AHARS notes appear on page 47



The SCARC VK5ARC radio shack – HF section.

Members working on the VK5AZM sniffer.

New era of digital amateur television begins

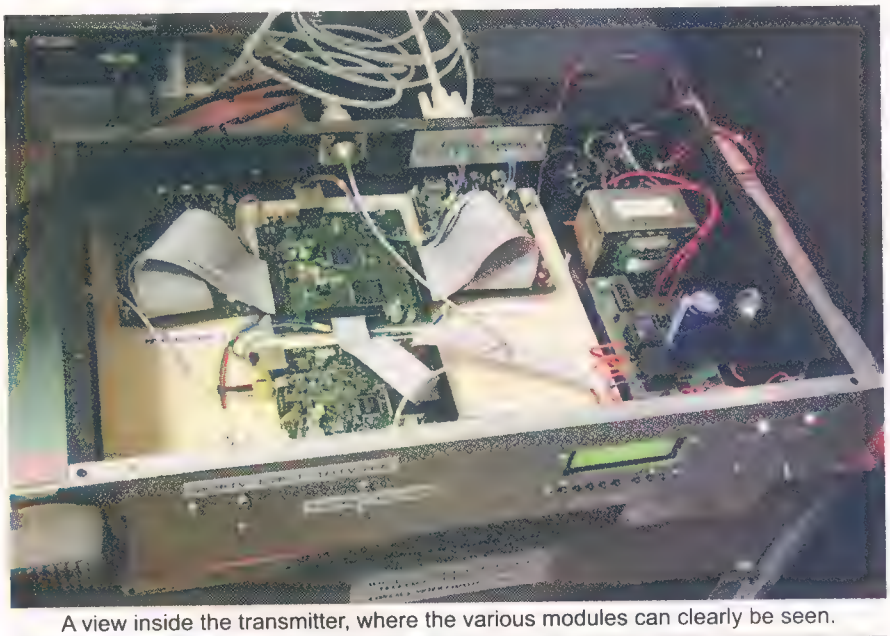
Peter Cossins VK3BFG and Jim Linton VK3PC

The arrival of digital amateur television is an outstanding achievement, occurring at the same time as commercial and ABC stations are just finding their way with the same digital medium.

The Melbourne Amateur TV Repeater, VK3RTV had its first test transmission of the terrestrial digital standard, DVB-T, on Sunday 7 June using a frequency of 446.5 MHz.

High quality pictures were received more than 40 km away, only limited by lack of stations further out. One station at about 30 km received the signal on his lounge room TV using a domestic TV antenna.

There was obvious delight heard in the voices of those reporting confirmation of their reception via the 2 metre 147.4 MHz ATV liaison frequency.



A view inside the transmitter, where the various modules can clearly be seen.

A view of the rear of the unit.

The output power was a very modest eight watts, but some stations received the signal with power levels down to two and then one watt. It is expected that the final output power will be around 15 - 20 watts.

VK3RTV is one of the oldest continuously running ATV repeaters, first on air in 1977. It was built, maintained and upgraded by Peter VK3BFG for more than 30 years, with the help of others in the Melbourne ATV Group. The digital project was proposed and engineered by him.

The major funding came from Amateur Radio Victoria and the Wireless Institute of Australia, which provided $1,000 under the WIA Club Grants Program.

The new digital system is multiplexed with two independent video channels each with two channel audio. VK3RTV has three input frequencies of 1250 MHz, 1283 MHz and 10.41 GHz and it is possible to have any two of the three running simultaneously.

During the test, VK3RTV1 carried live video, while VK3RTV2 had a colour bar test signal. The test was introduced by Jim Linton VK3PC, President of Amateur Radio Victoria.

Becoming the first face of DATV in Melbourne, he announced to camera "Welcome to Television, Digital Amateur Television VK3RTV", in a re-enactment style similar to the start of TV in Australia through TCN9 Sydney presented by Bruce Gyngell.

Reference was also made to radio amateurs having a long history of experimenting with various forms of television and publicly demonstrating it before TV officially began in Australia in September 1956.

The arrival of digital amateur television is an outstanding achievement, occurring at the same time as commercial and

ABC stations are just finding their way with the same digital medium.

The test transmission from VK3RTV on Mt Dandenong east of Melbourne also included a "show 'n tell" session conducted by Peter VK3BFG of the German made DVB-T boards and associated equipment.

As the amateur frequency is a non-standard TV channel, it is necessary to use the manual tuning function of a Set Top Box or Digital TV. On auto tune, the digital receivers seem to hop between standard channels.

Set Top Boxes known to work are TEAC SDB451, Compro Videomate PCI TV Tuner Card DVB-T300, RCA TRC 501AU, HUMAX DV-1000T, TEVION TV-1202 and a Twinhan DTV Alpha - USB. A Media Star DT-720 or Strong SRT 5006 may also work, although this has not been verified.

It would also be possible to use a down converter from 446.5 MHz to a lower standard TV channel and then any receiver should work.

Work on the project continues with the next stage being the controller to do all of the switching necessary to manage the complex system, and a video identification for the repeater.

The VK3RTV DATV project has sparked interstate and overseas interest. A detailed more technical focused article can be expected to appear in the WIA journal *Amateur Radio* magazine once the project is completed.

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Photographs: Robert Broomhead VK3DN

A view of the front of the transmitter box showing the control buttons and display

The antenna array of stacked Yagis can be made out amongst the many other antennas on the tower at the Mt Dandenong transmitter site.

Peter Cossins VK3BFG and Jim Linton VK3PC during some animated discussions about some of the features of the transmitter.

News from

Tim Mills VK2ZTM
c/- arnews@tpg.com.au

VK2

It is anniversary time in the far north of VK2 with the **Summerland ARC** turning 50 this month.

For the month they have the special callsign VI2SRC50. The 50th Aniversary Dinner will be held on the evening of Saturday the 8th at the Goonellabah Tavern. On Sunday the 9th SARCFEST from 0800 at the club rooms at Richmond Hill.

Work proceeded throughout last month on the tower, antennas and other work at the Clubrooms. This month is also busy with education: with a Foundation course on 15th and 16th and Advanced Theory on the weekends of 22/23 and 29/30. Inquiries to vk2dlr@sarc.org.au . There has also been many WICEN exercises with local horse enduros.

HADARC has exams on the 8th. Contact Tony VK2BTL on 02 9487 3383 or check the web site www.hadarc.org.au

Note the change of date and venue for the **Blue Mountains ARC** Winterfest this month. Details changed after last month's deadline. Winterfest will now be on Saturday the 22nd August at the Penrith Rescue Organisation (VRA) in Simeon Road, Orchard Hills. This is also the venue for BMARC meetings. The move was brought about due to renovations being undertaken at the former Glenbrook site.

FRED changes frequency. Australia's oldest 2 metre repeater – it was established before the formal start to VK repeaters in 1968. FRED is operated by the **Orange & District ARC** on Mt. Canoblas. It has changed to 147.025/147.625 MHz. The former channel 6700 is maintained and will be established as an "in town repeater".

FRED started life 'under test' on the old frequencies of 145.854 and 146.000 MHz. An early intermod on the mountain top was resolved by moving the repeater receive frequency from 146 to 146.100 MHz. When the first repeater planning meeting was held at Wodonga in September 1968, FRED was assigned the channel 1 split of 146.100 in and 145.600 out. When the next generation of repeater channels were developed in Albury in July 1972, the input remained on 146.100 with the new output on 146.700.

In the beginning FRED operated with antennas above and below an elevated platform between a couple of wooden poles in the middle of the mountain top. Next move was to place the receiver at the southern end in one of the communication complexes and the transmitter at the northern end at a TV Tx site.

There was several hundred metres of separation interconnected with a two pair cable – just buried – across the rocky terrain. This intermittently failed due to the rabbits having a taste for the PVC. The Club then moved the receiver to the transmitter end and for a while had the advantage of vertical separation provided by the host tower.

Then the two TV channels were joined by additional services of some of the highest output powers in use in Australia along with the many FM services again of considerable power and the mountain top became intermod city. For the past 8 to 10 years FRED has either been off air or severely down graded on the receive side. Hopefully the frequency change will give Australia's oldest repeater a new lease of life.

The **Orange District ARC** meet on the first Friday evening at 64 Warrendine Road at 7.30 pm. This month is their AGM. Contact address is P. O. Box 1065 Orange 2800.

The **Mid North Coast ARG** will be the first Field Day next year in the 2010 celebration year, being held at the regular site in Coffs Harbour on Sunday the 24 th January. A VIP guest has been lined up to open the Expo advised the President of MNCARG, Gary VK2ZKT. The following month the **Central Coast ARC** will have their Field Day at the Wyong Race Course on Sunday the 28 th February.

The **Oxley Region ARC** have moved their weekly evening 2 metre net back to Wednesday to take advantage of recently installed equipment at their meeting location – the SES building in Central Road, Port Macquarie. Club members attend SES activities on Wednesday evening. The other weekly net is Sunday morning. Both nets are conducted on VK2RPM 6700.

A reminder that the **Manly Warringah Radio Society** now meet at the Terrey Hills Seniors and Youth Centre, Yulong Avenue, Terrey Hills. Check out the map on www.mwrs.org.au For the moment the club telephone may not be operational due to the relocation.

VK2 WICEN in conjunction with HADARC are to re-establish the former WICEN repeater to a new site back at Chatswood. This month the major exercise was the week long Shahzada Horse Enduro 17 to 21 st.

The Hawkesbury Canoe Classic – 24/25th October – has a change in that the former major check point "Echo" is downgraded and "Delta" becomes a major maritime -water- checkpoint. Register your offers of help for this event now.

In October there will be the annual Barrington Tops Search and Rescue Exercise for the search for the missing Cessna 210 VH-MDX over the weekend 17/18th. WICEN is always on the lookout for photos of activities and exercises for publicity purposes. Contact via 0408 397 217 or email to "operations@nsw.wicen.org.au"

This is month of both the RD Contest and the Lighthouse event on the same weekend. Plan now to take part in both and help the State score in the RD and have a good time with the Lighthouses. **VK2WI** will transmit the opening address of the RD at 1730 Saturday via the normal broadcast channels.

Sydney amateur Syd Griffith VK2AHF was recently recognised in the Queen's Birthday honours list. He was awarded the Public Service medal ... for outstanding public service, particularly in innovative and sustained contribution to the enhancement and improvement of the technical capabilities of the New South Wales Police.

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News from VK3

Jim Linton VK3PC
Website: www.amateurradio.com.au
Email: arv@amateurradio.com.au

International Museum Weekend

This annual event began in 2002 and continues to grow, this year involving five Australian museums.

Our Event Coordinator Terry Murphy VK3UP liaised with the Maritime Trust of Australia and its volunteers who run HMAS Castlemaine as a museum moored at Williamstown's Gem Pier.

Radio was vital during WWII and many wireless operators had been radio amateurs before putting on a uniform to serve their country. Amateur radio has now put HMAS Castlemaine museum ship on the airwaves, during the International Museum Weekend.

VK3RAN was operated onboard Sunday 21 June making around 120 contacts throughout Australia and New Zealand, mostly on the 40 m band. Operators were Michele Grant VK3FEAT, Terry Murphy VK3UP and myself.

Also in the log was VK3ATL at the Geelong Regional Museum and VK3DJ Queenscliffe Maritime Museum (both a joint effort of the Geelong Amateur Radio Club and Geelong Radio & Electronics Society), VK3APC Moorabbin & District Radio Club Museum, and VK7FLI Furneaux Museum on Flinders Island.

Several radio amateurs in other states indicated they would be making inquiries about activating their local museums next year, and a few clubs are known not to have had enough time to organise things this year but are likely to be involved in future.

The weekend coincided with an annual display of military vehicles on Gem Pier that attracted many visitors who toured the ship and saw VK3RAN in action within the ship's bridge, that had magnificent views of the bay.

New VK3RAN QSL cards are being designed and plans have been made to put it on air for the International Museum Weekend in 2010.

Williamstown Lighthouse activation

On the weekend of 15-16 August, the International Lighthouse and Lightship Weekend, Amateur Radio Victoria will again be putting the Williamstown Lighthouse and Timeball Tower on air.

This will be the fifth year that VK3WI has activated the lighthouse under a permit issued by Parks Victoria.

Jim VK3PC and Michele VK3FEAT as acting "Sparks" on HMAS Castlemaine during International Museum Weekend.

Ian Downie VK3XID, who initiated the activity back in 2005, returns this month to be our chief operator and event supervisor. Members interested in being involved should send Ian an email via arv@amateurradio.com.au

Education – Standard & Foundation

Another of the highly successful Amateur Radio Victoria bridging courses will be held next month and enrolments are open.

This course is designed to assist those who have their Foundation Licence and want to upgrade to the Standard Licence.

It will be held on the evenings of the five Wednesdays in September, a revision session on Saturday 3 October, with assessments on the Sunday.

These courses are conducted by our instructor Kevin Luxford VK3DAP and have helped many over the past four years bridge the knowledge gap between the Foundation and Standard levels.

The venue will be 40g Victory Boulevard Ashburton. Office partitions that previously formed an interior office and corridor have been removed to more than double the meeting and lecture room area.

The next Foundation Licence training and assessment weekend is September 26 and 27. Do you know someone who could be interested in becoming a radio amateur? Then please do tell them about this opportunity.

Inquiries about the Standard Bridging Course or the Foundation Licence event can be made to Barry Robinson VK3PV foundation@amateurradio.com.au or 0428 516 001.

VK3RTV goes digital

It is all thumbs up for digital amateur television following recent test transmissions from the Melbourne ATV repeater VK3RTV at Mt Dandenong.

The major project to bring the repeater into the digital age using German made

Continued at foot of next page

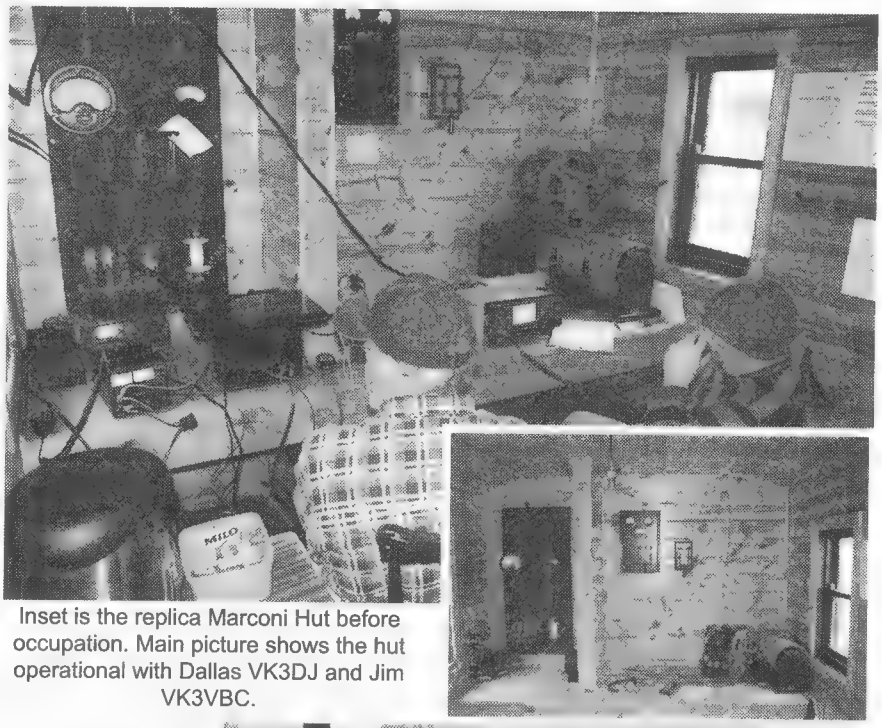
Geelong Amateur Radio Club – The GARC

Tony Collis VK3JGC

International Museum Weekend

This year the International Museum weekend was particularly notable in that two museum sites in Geelong were utilised in conjunction with the Geelong Radio and Electronic Society, the GRES, operating together as The Geelong Radio Group.

The Queenscliff Maritime Museum station was housed in a replica of the Marconi hut, built by the GARC and a local school with materials supplied by a local hardware company; the original hut was used for the first radio communication outside of Australia to Tasmania in 1906. Because of the power and antenna cables requirements, both doors of the hut were required to be open on what was a bitterly cold day. The station operated as VK3DJ on both HF and VHF over the 24 hour period working, amongst others, its sister station VK3ATL at the Geelong Regional Museum and also HMAS Castlemaine VK3RAN and Gavin VK7VTX on Flinders Island.



Inset is the replica Marconi Hut before occupation. Main picture shows the hut operational with Dallas VK3DJ and Jim VK3VBC.

Being around three meters above sea level, and with a hill in the way, contact with the GARC IRLP node was only achieved with the assistance of Jim VK3VBC using his 2 metre wide spaced DX Yagi. Dallas VK3DJ, who had supplied the G5RV and 20 m ground plane, made several contacts stateside using a USA reflector in his namesake, Dallas, Texas, on node 9660.

In all over 30 contacts were logged for the weekend.

Amongst the other operators were Ken VK3NW, Lee VK3PK, Tony VK3JGC, Garry VK3FWGR, Calvin VK3ZPK.

The situation at the Geelong Regional Museum was markedly different from that at Queenscliff in terms of the room available and on site catering facilities provided by the two ladies in attendance. Over 50 contacts were made from the museum during the 24 hour period, although earthing problems on the Sunday caused a lot of RF feedback problems until earth straps were put in place. In addition to those pictured, VK3YHT and VK3ABM were present over the weekend with visits from VK3ALB, VK3FMIC, VK3FJEN and VK3NJP. The event also attracted 40 plus visitors on the Saturday. **ar**

Ian VK3VIN with Barry VK3MBW and Barry VK3FBKS.

continued from previous page

TV broadcast standard boards was first proposed more than two years ago, but it was not until early this year the funding looked possible.

The Council of Amateur Radio Victoria allocated more than $3,000 and Peter Cossins VK3BFG with others wrote a professional submission to the WIA Club Grants Scheme that attracted a $1,000 contribution.

VK3RTV DATV can be received using manually tuned set-top boxes, and a list of about 15 brand name and models known to work has been published.

Peter VK3BFG tells us that the project's next phase is to build a new controller for the two channel DATV transmitter, and VK3RTV can then go 100% digital downlink.

Fancy that, amateur television beating the commercials to digital switch-over.

Centre Victoria RadioFest

It is coming back! Sunday 14 February at the Kyneton Racecourse. Watch for more details in coming months or check out the website radiofest.amateurradio.com.au

ar

Geelong Radio and Electronics Society (GRES)

Rod Green VK3AYQ

Once again, over the past three months our committee has provided us with many interesting and varied syllabus items, some of which are detailed here. We had one visit during this time and because of this we all ended up in gaol.

Do not be alarmed. None of us has criminal tendencies. We had a guided tour of the now decommissioned Old Geelong Gaol. The purpose of the visit was to let those members who had not had the chance to visit the gaol see not only the gaol itself but also our museum which is housed in what was originally an administration area of the gaol.

The night visit was organized by Keith VK3AFI who acted as tour leader. Keith had lived opposite the gaol for many years and had become friendly with many of the prison officers. Because of this he had on many occasions been inside the prison walls (as a visitor not an inmate) and had acquired considerable knowledge of the workings of the gaol system.

Keith even told of a number of breakouts he had witnessed over the years. After the guided tour of the gaol the members then looked at the various museum exhibits of old radios, telephones and valves on display. Visitors to Geelong may care to visit the gaol and take a self guided tour and also have a look at the museum collection.

A new program has been prepared for the last six months of the year. The emphasis during this time will be on homebrewing and in particular homebrewing of test equipment.

Some five evenings have been set aside for the construction of the "VHF Powermatch". This versatile test instrument was described in the magazine Electronics Australia back in 1990. The instrument allows the user to test SWR, power, RF impedance, and also has an RF probe. As well as construction nights for the project there will also be other nights devoted to the explanation of how each module works and how it can be used.

Bill VK3YHT teamed up with Pip VK3YME and gave a practical evening on coaxial transmission lines. They outlined the various different types of coax available, explaining which particular type could be used in a particular application. The talk was augmented with practical demonstrations of sweeping a cable using a spectrum analyzer and tracking generator to show the losses in the line.

Not only was this an interesting talk that was ably presented, it also showed the level of expertise available within our club. Our newer members to the hobby now realise how important the transmission line is, and how easy it is to lose power in the transmission line.

We had two guest speakers for the quarter.

The first was Barry Abley VK3SY. Barry has been a guest speaker on a number of occasions in the past. Once again he did not disappoint us with an excellent presentation on the history of wireless telegraphy. Barry outlined the history of telegraphy from the humble beginnings through to the use for maritime communications.

One fact that was new to us was that the first ship to shore communication took place in Victoria between a ship in Port Phillip Bay and the fort at Queenscliff. Anyone visiting Queenscliff may care to have a look at the plaque that commemorates that historic occasion. The plaque is located outside the walls of the fort on the North West corner.

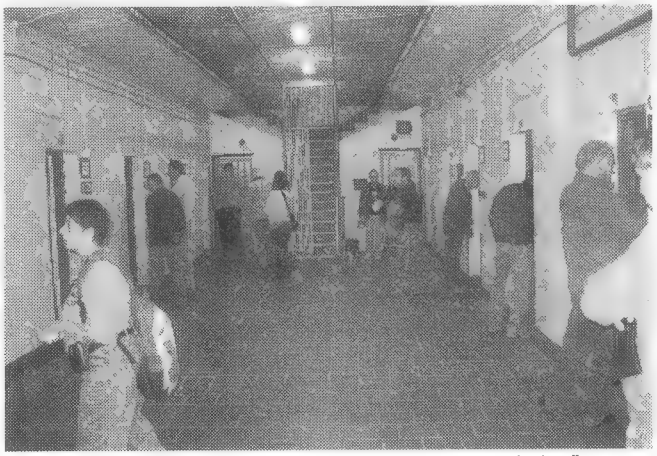
Our second guest speaker was Drew Diamond VK3XU. Our members are familiar with Drew`s construction articles and many of our members have constructed some of his designs. His topics for the evening were "paddy board" construction and coil construction.

As you would imagine this was an excellent presentation on construction methods and gave us many new ideas to be used on our own work benches.

Visitors to Geelong are invited to come to our regular Thursday evenings which are held at 237A High St. Belmont at 8 pm local time. Or perhaps join our Wednesday group for a coffee and a chat any Wednesday morning from about 9:30 am onwards.

ar

Keith VK3AFI, our tour leader for our night in gaol.



Members looking at the "private accommodation".

Amateur Radio Direction Finding (ARDF)

Bruce Paterson VK3TJN
Deadman's Flat 28th June 2009

The Deadman's Flat Hageby

It has been a while since AR has seen reports into ARDF submitted by Jack Bramham VK3WWW, but the Victorian ARDF Group (WIA) has continued to be very active in this branch of amateur radio.

The club was formed prior to the first IARU Region 3 ARDF Championships held in Australia by TARC in the 1990s, and has since staged, for WIA, the very successful 2003 Region 3 Championships near Ballarat.

ARDF is an on-foot competition where you try to locate up to 5 transmitters on a defined map area using hand held direction finding (DF) gear. The transmitters take turns transmitting on the one frequency for one minute each.

Competitions are commonly held using either 2 metre or 80 metre frequencies, with different DF gear required for each. For more specific details, take a look at our club website www.ardf.org.au

Here is a report on our most recent club event held at Deadman's Flat, not far from Daylesford, Victoria.

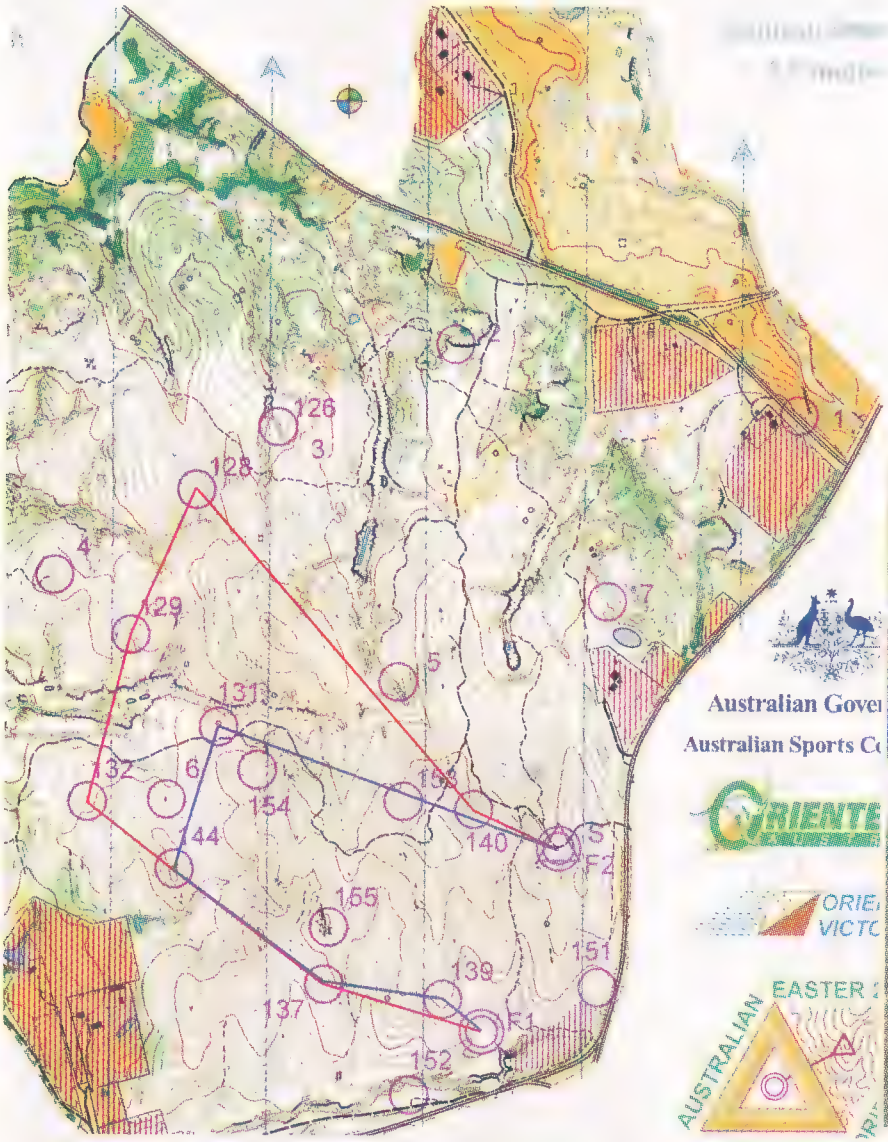
A Hageby event, in orienteering terms, is where you do a number of small loops, returning to the same point to change over maps for the next loop.

A radio Hageby is much more interesting, with a different form of radio navigation on each loop. We often refer to our events as RadiO, short for Radio Orienteering. This event was combined with a Bayside Kangaroos Orienteering Club bush orienteering event.

A FoxOr is a low powered transmitter of a few milliwatts transmitting continuously, placed somewhere inside a large (100 m) diameter circle on the map. To find a FoxOr you navigate on the map to the circle where hopefully you start to hear the, small, low powered transmitter, then attempt to find it.

Before the event I had 14 registered entrants. Wow, if they all showed up it might be a record local attendance for one of our RadiO events, perhaps challenged only by Ian's super organised Woodlands event a while back and of course eclipsed by the 2003 Region 3 Championships .

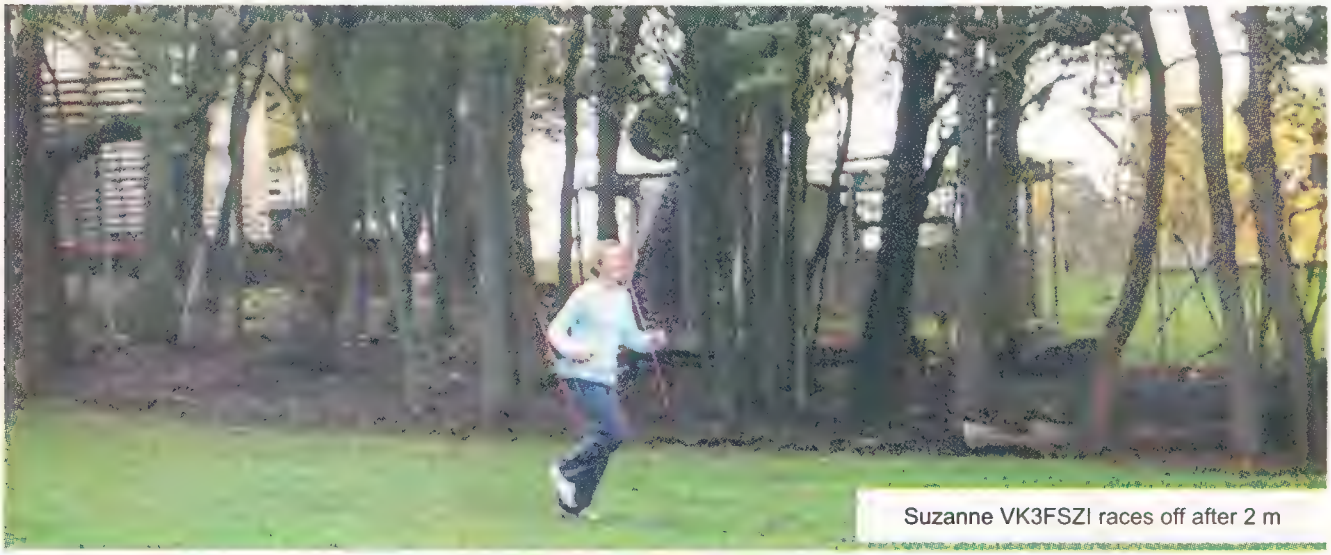
The day dawned freezing as I crawled out of my tent equipped with many layers,



In map image: 151→155 is the 80 m ARDF leg, 1→7 is the 2 m FoxOr leg, 5-in-5 is not shown. Bush-O legs for Short (Blue) and Long (Red)

Marta VK3FTZL, Fitzel and doggie bag return on 80 m. (Fitzel probably has a different 'fox' in mind)

The essence of ARDF: a sniffer, a scent, a sprint and a smile



Suzanne VK3FSZI races off after 2 m

beanie and gloves. It promised to be a fine day and at times it turned out so. I had strung up the 80 m antennas the afternoon before (with help from Jun and Greg). We really must get those extendable poles commissioned! I have had enough of flinging small rocks through high branches only to have the rock fall, or, more typically miss altogether.

I had only to put out the seven FoxOrs, attach the five 80 m ARDF boxes (what happened to those "day before" timers we used to have?) and quickly place the 2 m 5-in-5 course near the Start. This all took about two hours (driving, riding, running, clambering(!), gradually shedding layers of clothing), but I did have the fall back option of placing the 5-in-5 after competitors were on their first leg.

For some reason bush orienteering competitors were still not in evidence a mere 5 minutes before their mass start, but a fair RadiO crowd was gathering. Turns out, though Peter predictably was not able to make it in time, we gained an extra three with Grant Jeffrey, Pierre Brockner and Douggie joining in the RadiO. Sixteen! Grant had to choose between the RadiO and the bush orienteering, so despite the fairly lengthy Long course he tells me he had a good time. People were still getting organised so I ducked off to fix an errant TX#4 in the 5-in-5 leg that was not on.

The briefing outlined the four loops competitors had to do. There was some confusion about frequencies and which-leg-to-do-next for those who were not listening closely. The Long and Short had a different order in order

Neale VK3XJH with daughter Bridgette trying 80 m.

Mike in ARDF club colours

Adam VK3YDF dominates 80 m

Ian Chennell VK5JH/ VK3IDC tries 80 m for the first time.

to maximise the availability of club 80 m sniffers (a sniffer is a small, lightweight receiver and antenna combination). This was not a problem as I had a spare unit, plus my own left unused.

FoxOr

The FoxOr on 2 m consisted of Long: 6 out of 7 or Short: 4 out of 7 FoxOr circles. Some thought had gone into the placement so that the best ones to do were not immediately obvious due to terrain, rather than just distance.

We had some problems with signal strength on some of the legs. All were set on low power, but it seems this differs between units. There also appears to be a difference in sniffer sensitivity, with some less sensitive units making it harder for some. David now has all the FoxOrs and will perform some comparative tests to figure out what is going on.

This made a probably too lengthy loop even longer. I had made this loop for Long roughly the same length as one of the bush orienteering A course loops, worried that the 5-in-5 would make the total distance too short. In *line* distance it did seem on the short side, but the map is quite deceptive! I should not have worried about course length being too short as it turned out. Next Hageby the FoxOr loop will be shorter. Promise!

ARDF

Most enjoyed the 80 m ARDF. Short coursers had to get any three of five, Long all five. They were closer spacing than International rules to make the loop short. With the terrain involved, many thought this quite long enough, thank you. Again, the quickest loop was possibly not the shortest. A couple of Txs were right near the Finish/Assembly to keep in tune with the Hageby concept (so near yet so far...). Well done to Grant tackling a full five ARDF for the first time.

5-in-5

We have only had a few 5-in-5s in the past and I thought it would make an ideal short Hageby loop. I laid the course by walking in a line for about 50 seconds and plonking down a 2 m ARDF transmitter, then on to the next. I was careful to have the course cross over itself.

The idea is if a competitor is quick enough, they have time to run to each transmitter and find it within the minute it is on, so finding all 5 transmitters in 5 minutes (5 in 5). Then, back to the start.

Each TX was equipped also with an electronic SportIdent control for quick punching, and the homing beacon at the Start has the Finish punch. The Start punch on the changeover table was later used to calculate the amount of time to deduct from each competitors total as the 5-in-5 loop has to be started when TX1 starts, not when a competitor arrives from a prior loop. Good idea Adam.

Next time we will not use the homing beacon, instead competitors can just navigate back. It interferes a bit with competitors starting.

Adam proved the 5-in-5 was do-able, completing it in just over 6 minutes. He said he had to run fairly hard though, so perhaps a 50 second fast walk is a bit far considering the overhead of punching and DFing. No-one else managed it in 5.

Ewen claimed sniffer beam issues mid course, and others had a truly dreadful time, some taking longer than their entire 80 m ARDF leg! Not sure why there were so many reflections because each TX would have been line-of-sight to the next, except perhaps the final leg TX#5.

I later discovered the reason for the recalcitrant Finish punch. I had managed to reprogram it as a Start control (weird, because it was definitely a "wired" finish at the recent MTBO event). Hence the Cleared punches I had on the table all beeped when tested... a Start was what they were expecting, but anyone who had done the course did not beep (already 'Start'ed). All makes sense now, so we do not have to blame new fangled SI sticks or the Homing Beacon causing EMC.

Bush-O

Most headed off with (tired) relief on the final Bush-O leg to the finish. Not everyone had a great time on this one though. Greg was sighted waving from the wrong side of a chasm on a couple of occasions and admits he really should have read the map a bit better. We all know that feeling!

I have also heard Louise was so annoyed she managed to miss the Finish altogether and was blowtorching the surrounding bushland with deep felt profanity when the Registration tent simply refused to metamorphose into a Finish tent.

Results

I hope everyone had a good time, despite the Long course being a bit long (but that line distance is indeed correct). Alas, the DNFs below do not show the successful good legs these competitors did. It might be worth keeping a rough record of the stage times in the future. Hope Marta is feeling better.

Special mention to Greg Williams for (mostly) completing his course entirely walking in one of his rare bush appearances (hopefully we will see more of him, and Douggie). Very well done to Grant for completing a Long course in his first major radiO event.

PS: Where did Douggie go? He never returned to the Start on one of the legs.

Radio Long Results

1	Gary Panter	AR 129.10
2	Ewen Templeton	AR 173.57
3	Grant Jeffrey	BK 175.50
	Louise Hall	DR DNF
	David Beard	AR DNF
	Marta Salek	AR DNF

Radio Short Results

1	Adam Scammell	AR 76.53
2	Darrian Panter	AR 122.55
3	Mark Besley	AR 149.42
4	Suzanne OCallaghan	AR 153.28
5	Greg Williams	AR 175.59
6	Clifford Heath	AR 183.58
	Pierre Brockner	BK DNF
	Doug Canning	AR DNF
	Dianne Shalders	AR DNF

More detail about the ARDF group, including contact details, can be found at the website: www.ardf.org.au

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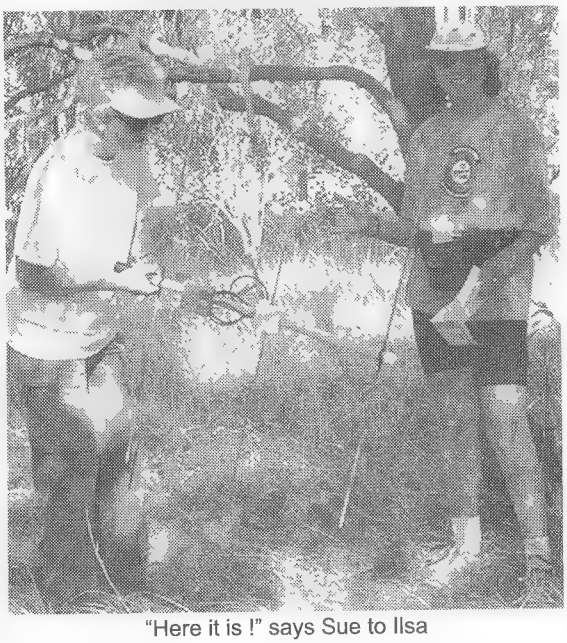

"Here it is !" says Sue to Ilsa

News from

Well it has been a little quiet and slow in Queensland for the past month, so if you have anything new or interesting happening within your club, do not be shy and tell the rest of our readers all about it.

SCARC

The Sunshine Coast Amateur Radio Club (http://vk4wis.org/) wishes to announce that it will be holding its annual Sunfest in September on Saturday the 12th 2009. At the usual place, Woombye School of Arts, Blackall Street (UBD map 66F12), Woombye.

There will be 25 tables of new and pre loved gear for sale, displays and information tables for new and old operators alike. The entry fee of $5.00 will be used on the booking of the hall and maintenance of our services to the area.

To make a reservation for a table please contact Harry Ameer Beg VK4TK on 0409488025 or email vk4tk@dodo.com.au or Noel on vk4nl@iprimus.com.au Booking early will ensure that you get one of the very popular tables. Cost of a table is $15.00 and this includes two entry tickets in the door prize – additional tables will be $10.00 with one entry in the door prize. There will be excellent door prizes as usual this year. Entry to stall holders is 0700, entry to general public 0900 (local time). The door prize will be drawn at 1300. Be there to win other prizes throughout the day.

There will also be the very popular "Kitchen" as usual with hot and cold food and drinks. "Talk in" on the local repeater on 146.850 from around 0700 local time will also be on the agenda.

Thanks to Harry VK4TK for keeping us informed on events within VK4.

CHARC

The Central Highland Amateur Radio Club Annual General Meeting is taking place at Camp Fairbairn near Emerald from late Friday afternoon 25th to Sunday Morning 27th September. Accommodation is available on site; there is a big BBQ dinner and Monster Auction on Saturday Night and a Recovery Breakfast on Sunday morning.

Time to prepare for a great weekend away from home and to catch up with some old friends (and make some new ones as well).

EchoLink is up and running: Steve VK4SMW and Rob VK4HW have just finished installing it on the server. The node number is 6037 for IRLP and 457011 for EchoLink.

To gain access to EchoLink the # key needs *to be used before the EchoLink node you want to connect to i.e., to connect to VK4RSA in Sarina the code is #360460; to disconnect use 73. To connect to IRLP you just need the 4 digit node number to which you want to connect. To disconnect use 73 also.*

Mackay and District Amateur Radio Association

Friday 7, Saturday 8 and Sunday 9 August sees the State Championship Horse Endurance Ride at Denison Creek Station, near the Retreat Hotel. Help the folks from the Mackay and District Amateur Radio Association to run communications support for this 160 km Horse Endurance Ride.

Expect to be on the ground by 2 pm Friday afternoon to be shown to your checkpoints. Play with radios in the picturesque countryside perched on top of the Connors Range.

SHAGS

Senior Hams and Geriatric Stirrers meet every Friday morning 9 am to midday at The Tropical Wanderer Resort, 394 Yaamba Road, North Rockhampton QLD 4701.

Beside the Pool or Bistro (depending on weather conditions), senior stirrer Les VK4QI and his wonderful wife June (non stirrer) have been entertaining this event for quite some years now. Members and guests are welcome to drop in for morning refreshments prepared by June, who I have been advised also does all the washing up. Thank you, June.

Ham operators from near and far have been known to drop in during their travels, with twenty-three being the record in one sitting. Can this record be broken? The morning displays a general chin wag, gossip and stirring session along with a little B.S. So next time you are passing through, whether you are local, interstate or south of the border drop in and say hello, you will be most welcome.

Until next time 73
VK4VKR (IRLP 6973)
On the side and listening.

ar

SHAGS gathering. L to R: Lyle VK4LM, Les VK4QI (standing), Brian VK4QB (standing), Bill VK4FGN, Bob VK4HRC, John VK4KDN, Merv VK4DV, Blair Smith (listener).

VHF/UHF – An Expanding World

David Smith VK3HZ – vk3hz@wia.org.au

Weak Signal

David Smith VK3HZ
vk3hz@wia.org.au.

Winter VHF/UHF Field Day

The main event for the month was the Winter VHF/UHF Field Day, held this year on June 20/21 – one day before the shortest day of the year. Despite the time of year, the weather was quite reasonable in this (south eastern) part of the country and a number of portable stations set up – for quite a number it was their first time out. However, it seemed that only a hardy few elected to remain out overnight for the 24-hour duration.

Andrew VK1DA braved the hills around icy Canberra:

I operated on Saturday only in this event, from Red Hill, in the south of Canberra near Parliament House. My contacts were limited to 6 m, 2 m and 70 cm on which I worked 4, 24 and 12 contacts respectively. The only other VK1 portable station worked was Dale VK1DSH, on 2 m and 70 cm.

Conditions appeared to be very poor. Signals into the Sydney area were well down on last year. Only one VK3, Norm VK3DUT, was heard or worked. Weather at my location was quite mild with a few minutes of very light rain, out of a heavy overcast.

I had two site visitors, Aaron VK1FAPH and Johan VK1ABB, neither of whom I had met before. This was a result of publicising my intended location on the local mailing list and inviting visitors.

Thanks to those who did operate either as a portable or home station. And a special thanks to Brad VK2QO who has already sent me an eQSL for the very nice CW QSO we had during the afternoon.

Steve VK3DAG reports on his efforts to the northeast of Melbourne:

My father Rex, Spud Dog and I had an uneventful trip to Mt Terrible in the 4WD with A-Van Caravan in tow. The last 16 km up on to Mt Terrible is a dirt 4WD track but, with the centre diff locking engaged, we climbed it OK.

Mt Terrible is 10 km south of Jamieson and 1310 metres high. At the top, there is a fire spotter's tower, some communication gear and a high country hut. We set up about 1 km south of the tower.

I set up four bands for the contest - 6 m, 2 m, 70 cm and 23 cm. All bands used Yagis stacked in a Christmas tree arrangement on a 6.5 m length of black pipe using the 4WD as ballast. Rotation was by hand in an Armstrong fashion.

The shack was located in the end of the caravan annex. I used a Kenwood TS-2000X that was interfaced with a PC running the VKCL software to automatically synchronise with the transceiver frequency and band data. All that had to be entered was Call Sign, Number Received and Maidenhead Locator. This made the logging job a lot easier. The microphone was hand held although it would have been easier with a VOX Headset or a Desk Microphone to keep your hands free for data entry.

The caravan and annex was heated with a Cow Cooker Stove that burned on wood. This kept the camp inside dry and warm considering that we had quite a bit of rain outside. I powered the portable station with a 240 Volt Generator, which gave ample power for the lights, transceiver, and PC.

The greatest distance for a contact was made to Mackay Queensland on 6 m. I made a lot of contacts into the Melbourne area. I believe it was a successful weekend considering the weather was no greater than 5 degrees C in the clouds.

I look forward to the next field days and hope to hear you call CQ Contest.

Tim VK5ZT was out again, but with a more restrained approach this time:

I am fortunate to be within easy reach of sites that permit the use of three grid squares working into Adelaide so we set up the wife's Falcon with portable gear again. The Beemer had a bit of a hammering around the pine forests for the foxhunt championships two weeks ago as a last minute vehicle option (again) as a result of an eleventh hour failure of the van (lost a cylinder the night before we were due to pack!) One of these days that van will actually make it to a contest...

I did not want to jam dishes and stuff in the BMW boot so I opted for the roomier Falcon instead. I bolted the tri-band dish to a bracket on the towbar, along with the mount for the verticals. I got some interested looks from vehicles coming up behind me who found themselves staring into the dish! Unfortunately our microwave efforts were a disaster, as explained later.

I started out at the hilltop site I used for the JMMFD. The single tree was perfect to sling up the 6 m antenna. It comprised a wire dipole zip clipped to a nylon cord I threw up into the tree... worked very well. There was a bitter wind blowing and it started raining just after I arrived. All bands from 6 to 23 cm worked well and I racked up a few contacts. 10 GHz was a dead loss - .the current system had never been tried over the distance (around 100 km) and I heard nothing of VK5LZ at the other end. A similar result happened on 3.5 GHz but I was unable to persevere due to heavy rain.

After a couple of hours I moved down the coast about 50 km to a hill overlooking Ardrossan (new grid square). All bands to 23 cm were good into Adelaide, with extra 23 cm signals heard.

This area was windy but sunny and I had better hopes for the microwave

The camp at Mt Terrible

gear - no such luck. When tuning around on 3.5 GHz there were signals all over the place.

It turned out that the hill was the ideal site for a number of commercial installations, which were spraying the area with microwave energy, which my very broad receiver readily brought to my attention! Forgetting the 10 GHz stuff, I tried 5.8 GHz....it turns out that there were a number of sources on the single frequency I had.

They were scattered across the Adelaide plains and I could pick them out as I swept the dish up the coastline - everyone except VK5LZ, that is. Well, I made a number of contacts on the lower bands and was happy with that and moved back north to my tree on the hill after a couple of hours. I could work everyone again as three hours had passed. One last try on 3.5 GHz actually heard VK5LZ but they could not find me, and it rained yet again!

After contacts petered out I headed north towards home, passing within one km of Derek VK5AGZ who was doing a bit of grid hopping himself. I had one last site in mind (new grid square) that was on my way home - the lookout at Lochiel. I rolled in there in darkness much to the surprise of a couple of campers in a van who thought they had a nice isolated spot!

It was the last half hour of my 8-hour stint so I hastily deployed the 6 metre wire antenna...by now looking a lot like a tangled ball of wet string but still with an acceptable SWR! I worked everyone I could hear within 15 minutes but found I could not hear a thing on 23 cm.

I wanted the points for that last grid square so bundled the gear in the car and took off back down Highway One to a hill nearer the city. I went up a muddy dirt track then up another track that would scare goats, to a hilltop. Here, standing on a dirt mound holding the 23 cm beam high above my head I managed to exchange numbers with VK5LZ with a couple of minutes to spare.

VK5AGZ was still lurking about and wanted a contact on 6 m so I rapidly deployed the "ball of string" antenna into an adjacent bush - all of this in pitch blackness using only light from inside the car (left the torch at home).

The SWR was still OK and the radio was happy to dump 100 watts into it but Derek could barely hear me due to a large hill in the way and we could not exchange numbers as my last minute ticked away.

So, there we have it, my first winter field day. I resolved to rebuild all the microwave gear and renew my efforts on the cursed Nissan Nomad. Needless to say, as soon as I got home, she who must be obeyed commanded that I get that junk off her car.....73, Tim VK5ZT.

Alan VK3XPD, Mike VK3KH and Peter VK3TPR set themselves up on the side of Arthur's Seat to the south of Melbourne, with all bands covered to 24 GHz. While the lower bands were quite active, the microwave side was fairly quiet. They did achieve contacts into Melbourne and Ballarat on 2.4 GHz and into Melbourne on 10 GHz. They did have quite a spectacular view of the sunset to keep them entertained.

See a colour photo of the equipment and the sunset on next page.

Echoes of Apollo 11 EME

A brief report from Chris VK5MC of his activities over the Echoes of Apollo weekend appears on page 53.

The Magic Band – 6 m DX

Brian Cleland VK5BC

Although there were several winter 'E' openings, they were generally of short duration with signals low in strength and overall a disappointing winter season. Below is a summary of the 'E' openings:

23rd May	VK3 - VK5, VK4 - VK5
24th May	VK4 (Mackay area) - VK5, VK5 - VK6
25th May	VK4 (Far North area) - VK5, VK3 & VK2
2nd June	VK4 (Mid North area) - VK5 & VK2
9th June	ZL3 &4 - VK3 & VK4, ZL2 - VK2 & VK4
13th June	VK4 (Brisbane area) - VK3 & VK7
14th June	VK4 (Mackay area) - VK5 & VK3
(Best day)	VK6 - VK4 & VK5, VK4 (Brisbane area) - VK7 & VK2
22nd June	VK4 (Mackay area) - VK2 & VK3, FK8 Beacon - VK2 & VK4
23rd June	VK2 - VK5
24th June	VK4 - VK5
26th June	VK5 - VK6

Brad VK2QO reports:

May was quiet for me but June has been a lot of fun with M/S and A/E, also some Es. The Es has not been in favour for VK2 but has been good for other states. Only two contacts for June via Es, VK4CZ Scott and VK4MA Paul both on the 14.6.09 (at work when E's are around on other days).

Now for the M/S and A/E in the mornings. VK5RBV, VK5VF, and VK4RGG the only beacons heard in June with some good burns lasting up to 40 sec and up to S2 at times. Contacts were made in CW with Scott VK4CZ, Brian VK4EK, Phil VK4FIL, and Dougal VK4EKA and in CW & SSB with Brian VK5BC.

73 Brad VK2QO

The Atherton beacon on 50.281 CW is now running in test mode and was heard by Adam VK4CP and Grant VK2MAX on 22nd June.

Several stations including Joe VK7JG (Launceston), Brad VK2QO, Scott VK4CZ, Brian VK4QB, Brian VK4EK and Brian VK5BC have all been monitoring for M/S early morning with several contacts being completed. Watch the VKLogger early on Saturday and Sunday mornings.

Interest has also been shown in WSPR (pronounced "whisper") which stands for "Weak Signal Propagation Reporter." This program is designed for sending and receiving low-power transmissions to test propagation paths on the MF and HF bands.

Users with Internet access can watch results in real time at WSPR.net. Several stations have been testing with this software on 6 m with varying success.

Although Doppler shift appears to affect decoding of signals, it is showing promise and could be of assistance as a form of beaconing to indicate band openings. If interested, search for WSPR on the internet and download the free program. As with WSJT you require interfacing between your radio and computer.

Now is a good time to check your station out and carry out any antenna maintenance or upgrade in preparation for the coming new Sunspot cycle and next summer 'E' season.

Please send any 6 m information to Brian VK5BC at briancleland@bigpond.com .

Digital DX Modes

Rex Moncur VK7MO

New Australian 10 GHz (3 cm) Digital Record

On 23 June Rex VK7MO and Justin VK7TW ventured up northern Tasmania's Mt Barrow and Dave VK3HZ went to Mt Fatigue in Gippsland to attempt a 10 GHz digital contact over a 325 km path.

The mode used was JT65a, which works to around 28 dB below the noise in a normal SSB passband. To achieve this performance, JT65a uses 64 separate tones spaced just 2.9 Hz apart and requires an extremely stable frequency. To meet the stability requirements at 10 GHz both stations used GPS locked transceivers and transverters.

At the Mt Barrow end, transmitter power was 10 watts to a 65 cm diameter dish antenna. The antenna power amplifier and transverter were mounted on the roof of a rock hut on Mt Barrow and remoted a few metres to the transceiver and computer in Rex's car (see picture). Justin was on the roof of the hut adjusting the antenna in azimuth and elevation and Rex down below operating.

At the Mt Fatigue end, seven watts was going into a 45 cm diameter dish antenna. The plan was to leave the radio equipment outside in the cold and operate the laptop from within the car but it was a balmy 18 degrees on the hilltop so the deckchair operating position was adopted.

Alan VK3XPD, Mike VK3KH and Peter VK3TPR caught some lower bands, a little micro and this great sunset from Arthur's Seat.

Almost as soon as the Mt Barrow end was set up SSB signals were copied at up to S6 with very deep and rapid QSB. A change to the digital mode JT65a produced immediate results and a new Australian 10 GHz digital record with signal levels peaking at -2 dB giving around 26 dB to spare.

While the contact and new record was completed in a few minutes, testing continued for around half an hour with the pleasing result that the difference in frequency was less than one 3 Hz bin for the full period. This represents a frequency error for both stations of less than 3 parts in 10 to the 10th or 3 parts in ten thousand million. In the case of the oscillator used at the Mt Barrow end, this was locked to GPS frequency at Rex's home and maintained frequency over some 4 hours driving over the sometimes rough dirt road up the mountain.

A review of radiosonde data from Melbourne Airport showed no evidence of ducting high enough to be useful so the contact can be put down to normal troposcatter and should be repeatable under normal conditions. Given that there was some 26 dB to spare, there is the opportunity to extend this distance significantly in the future and further tests are planned.

FSK441

Welcome to Tim VK2XTT who has joined in the weekend meteor scatter activity and completed his first QSO. Congratulations to Waldis VK1WJ who continues to complete with ZL on just 20 watts.

Please send any Digital DX Modes reports to Rex VK7MO at rmoncur@bigpond.net.au.

ar

Two ends of a 325 k record, Mt Fatigue (VIC) set up is above, Mt Barrow (TAS) below.

Contests

Craig Edwards VK8PDX (ex VK5HRT)
vk8pdx@yahoo.com.au
PO Box 285, Alice Springs NT 0870

Contest Calendar for August — September 2009

August	1	TARA Grid Dip	PSK/RTTY
	1	Waitakere (NZART) Sprint	CW
	1/2	10-10 International QSO Party	SSB
	1/2	North American QSO Party	CW
	8	NZ Boat Anchor	CW/Phone
	8/9	Worked All Europe	CW
	15/16	**Remembrance Day Contest**	**CW/SSB/FM**
	15/16	Russian District Award Contest	CW/SSB
	15/16	Keymen's Club of Japan Contest	CW
	15/16	North American QSO Party	SSB
	29/30	**ALARA Contest**	**CW/SSB**
September	5/6	All Asia Contest	SSB
	12/13	Worked All Europe Contest	SSB
	19	**Westlakes Cup (80 m)**	**Voice**
	19/20	Scandinavian Activity Contest	CW
	26/27	Scandinavian Activity Contest	SSB
	26/27	CQWW RTTY DX Contest	RTTY

Well my big news is that I have moved interstate and north to Alice Springs and changed from VK5HRT to VK8PDX.

As with all interstate moves it takes a lot of time away from the radio but I will still be able to put up a temporary full size dipole on 80 m for the NZART Memorial contest, so hopefully I can make the journey to give our friends from across the Tasman the VK8 multiplier.

I aim to have the 14 MHz monoband beam and multiband vertical with 60 radials all up and running by the end of July in time for IOTA. Remember if you have any comments about your on-air contest experiences then please send them to me at vk8pdx@yahoo.com.au

VK Shires Contest – inaugural event

The dust has settled after the first VK Shires contest which ran in the 1st week of June. A reminder, log entries must be submitted by September 1, 2009 to be eligible for awards.

Submit your electronic log in the Cabrillo format created by all major logging programs. Send via e-mail attachment to contest@vkshires.info Full details are at www.vkshires.info.

No matter how many QSOs you made, I strongly encourage you to send in your entry. With this being the first year, there is nothing more encouraging than to have as many log entries as possible.

One week before this contest, we had sold our home and were packing for our relocation to Alice Springs. Fortunately we were on top of things and so I was able to 'escape' and set up a mini-contest station using tents on the water's edge at a caravan park in the Coorong CO5. Due to the freezing temperatures, I set up a sleeping fort made of pillows, blow up mattress, quilts and blankets in the van – it was like a kids jumping castle every time I got into and out of bed!

The operating tent was a four-person dome with enough room to do the contest, and I strategically put a two-person dome tent in the middle of my radial field to barricade off potential visitors. I was able to set up at the far end of the caravan park away from on-site cabins and only 30 m from the water's edge.

This gave a great take off for my HF9V ground mounted vertical with 60 x 20 m radials which was my 40 m and 80 m antenna and a full size two element Yagi for 20 m with strong arm rotator on a telescopic pole as a portable tower. This had a real field day atmosphere and I had no family or friends responsibilities to worry about – just radio! At 0600 UTC kick off, I started on 20 m but it was slow going with just a few VK and USA stations in the log, so by 0620 I dived into the beehive of VK activity on 40 m.

This was very heartening as the activity was akin to this year's John Moyle Memorial Field Day. Surprisingly 40 m became unfashionable by 0800 UTC and was a ghost town very quickly. So from 0800 to 1400 UTC I played on 80 m, despite the high noise levels the band was very busy.

It was vital to have a copy of the shires list with me to let people who had inadvertently become involved in all the fun know which VK shire abbreviation

they had to use in the exchange. There were times I had to Google the person's town and tell them where they were!

There was not a lot of activity Sunday morning on 80 or 40, but no matter as the DX presented itself all day on 20 m. So it was very enjoyable to pick up VK QSOs interspersed with state-side and the odd European. I had to tear myself away from the 20 m DX late in the contest to go down to 40 m at 0520 UTC to pick up some late new VK shire multipliers.

As I tuned up the band, Laurie VK7ZE was going gangbusters into USA and then Europe on 20 m. Laurie reported having S9 to S9+20 PLI noise for the first 12 hours which made hearing stations on 40 m and 80 m very tough.

Laurie reports: "*Managed to score around 150 or so shires and I think five zones by the time I called it quits just after 1:00 am, on 80 m. Sunday morning 5.30 am - calling relentlessly on 80 and 40 with negligible response, so I decided to try 10, 15 & 20 m. Nothing on 10 or 15 m, kept checking regularly and no signals surfaced for the whole contest. 20 was a different story altogether, how would I describe 20? OUTSTANDING!!! Best propagation I have experienced in years.*"

Laurie's bag of DX consisted of VK, ZL, USA, VE, ZS, GI, S5, I, G, 4X, A6, JY, UA, OD, KH6, Antarctica, UR, XE, CU, PA, OK, KP4, SM, EA, EI, T7, F, GW, DL, GM, OH, ON, 3D2, JA and SP. Being its first year, he had the time consuming task of explaining about the contest and the rules during his pile-ups. As Laurie VK7ZE says "*It was amazing how many overseas stations did not know what CQ zone they operated from, for that matter it was also surprising to see how many Australians didn't know what shire or local council area they lived in. Amalgamation did not help in some cases.*"

Thanks Laurie for your account from the contest, this is the kind of contribution that I welcome from all contesters in VK about their experience. It certainly was an enjoyable 24 hours and I will be looking forward to giving people the AS8 shire in next year's event. The rules are currently being revised to make this event bigger and better for 2010.

IARU HF World Championships

As I write this column it is only a week until the IARU HF World Championships. An unfortunate clash of dates has meant I will not be able to compete. We will be living it up in Townsville that weekend with the family to attend the inaugural V8 Supercar event in the city. There is always next year, I would hate to miss it then when the multitude of WRTC teams compete in 2010.

ALARA contest August 29 — 30

Full details are available at www.alara.org.au

Here are the rules for this month's ALARA contest run by the Australian Ladies Amateur Radio Association. Eligibility: All licensed operators throughout the world are invited to participate. Also open to SWLs.

Object: Participation – YL works everyone, OMs & Clubs work YLs only.

Mode: CW and SSB

Time & Dates: 0600 UTC Saturday August 29 to 1159 UTC Sunday August 30

Bands: 3.5, 7, 14, 21, and 28 MHz. The following are suggested frequencies for easier location of contacts: 3.560 to 3.590, 7.070 to 7.100, 14.250 to 14.280, 21.170 to 21.200, 21.380 to 21.410 and 28.380 to 28.410 MHz.

Operation: Every individual phone or CW contact may be counted. There must be an interval of greater than 1 hour between contacts with any one station on any one band and in the same mode. No net or list operations. No crossmode operations. No crossband operations. All contacts must be made in accordance with operator and station licence regulations.

Procedure: Phone call "CQ ALARA CONTEST" and CW YLs call "CQ TEST ALARA". OMs call "CQ YL"

Exchanges: ALARA member: RS or RST, serial no. starting at 001, ALARA member, name.

YL non-member, OM or Club: RS or RST, serial no. starting at 001, name, and whether a club station. OMs, Clubs & SWLs work YLs only.

Scoring:

Phone: 5 points for ALARA member contacted, 4 points for YL non-member contacted, 3 points for OM or Club station contacted

CW: All contacts made on CW count for double points. OM, SWL, & 5 points for ALARA member logged

CLUB: 4 points for YL non-member logged

Logs: Single log entry. Logs must show date/time UTC, band, mode, callsign worked, report and serial number sent, report & serial number received, name of operator of station worked, whether it is a club station, and points claimed. Sample Log available on website. Logs must be signed and show full name, callsign and address of operator, and show final score (points claimed). Logs must be legible. No photocopies. No logs will be returned. Decision of the Contest Manager will be final, and no correspondence will be entered into.

Logs must be received by the Contest Manager by: 30th September 2009.

Contest Manager: Lesley Smit VK5HLS PO Box 271, Ashton SA 5137 or alaracontest@wia.org.au

Certificates for: top score overall, top score phone only, top score Australian YL CW, top score DX YL, top score ALARA member in each country and VK call area, top score YL non-member in each continent, top score OM in each continent, top score SWL in each continent, top score VK YL Foundation Licence holder, top score overseas YL CW, top score VK Club station.

Trophies will be awarded to the following: top scoring Australian YL, top scoring Foundation Licence ALARA Member.

Club stations: Operators of club stations may use the club call only for contacts, and MUST identify each contact as with a club station. Use of personal callsigns while operating as a club member is not permitted. A club station will be recognized as such whether operators are YL or OM. If the club call is used, the score will be as a club station.

2009 Remembrance Day Contest Rules

0800 UTC Sat15th August to 0759 UTC Sun 16th August

Full Details and History, Peter Harding VK4OD Contest Manager:
http://www.wia.org.au/members/contests/rdcontest/

Purpose:

This contest commemorates the Amateurs who died during World War II and is designed to encourage friendly participation and help improve the operating skills of participants. It is held on the weekend closest to 15 August, the date on which hostilities ceased in the southwest Pacific area.

It is preceded by a short opening address by a **Guest Speaker** transmitted on various WIA frequencies during the 15 minutes prior to the contest. A roll call of amateurs who paid the supreme sacrifice during WWII is read.

A perpetual trophy is awarded annually to the Australian state or territory with the best performance. The name of the winning State or Territory is inscribed on the trophy, and that State or Territory then holds the trophy for 12 months. The winning State or Territory is also given a certificate, as are leading entrants.

Objective:

Amateurs in each VK call area will endeavour to contact amateurs in other VK call areas, ZL and P29 on all bands except WARC bands. On 1.8, 28, and 50 MHz and above, entrants may also contact other amateurs in their own call area.

Contest Period:

0800 UTC Saturday, 15th August 2009 to 0759 UTC Sunday, 16th August, 2009. As a mark of respect, stations are asked to observe 15 minutes of silence prior to the start of the contest, during which the opening ceremony will be broadcast.

Rules:

1. Sections:

(a) High Frequency for operation on bands below 50 MHz;

(b) Very High Frequency for operation on and above 50 MHz;

Operators may enter each **section**, but separate logs must be submitted for each section and for each Callsign used on that section by the operator.

2. Categories:

(a) Single Operator;

(b) Multi-operator.

Note: In the (Multi-operator Category, many clubs work under this banner, All stations are permitted to enter in **"ONE and ONE ONLY"** of the following sub-Sections:

3. Sub Sections:

(a) Transmitting Phone (FM, SSB);

(b) Transmitting CW (CW); Note: CW in this context means CW only; any other digital modes such as Packet, RTTY, AMTOR, PSK31, etc are **specifically** excluded from the contest.

(c) Transmitting Open (a) and (b);

(d) Receiving (a), (b) or (c).

3.1: WW2 Ex Military Transceivers and Receivers.

The use of these types of equipment are subject to these conditions:

(a) To qualify we require a Photo (most Hams have access to a digital camera) of the equipment they propose to use, and it MUST be equipment as used in WW2, and not post WW2 manufactured equipment.

(b) A declaration with the heading of WW2 Equipment will operate said units within the "ORIGINAL manufacturers specified operating conditions", eg no mods to boost the output power etc. A copy of the preferred Certificate is available on the on the WIA website at: http://www.wia.org.au/members/contests/rdcontest/documents/WW2%20declaration.pdf

(c) As part of Para 2 above the declaration will ask for

1. Make (if known)
2. Power output available
3. Type of Antenna to be used, it should be of those types available in WW2 period.
4. Anticipated modes AM or CW of FM, (as SSB was not available until the fifties)
5. Frequencies they will use (I look for your guidance here)

(d) Scoring will be the same as in Para 13 of these rules

(e) A Certificate with an addition of a area showing the WW2 Category named within.

4. Offshore Eligibiity

All amateurs **licensed** in Australia, **and not physically within VK/P29/ZL may enter: VK operators outside VK may enter the contest, whether their stations are fixed, portable or mobile. See Rule 16.**

5. No Cross band, internet, Satellite

(a) Cross-band and/or cross-mode contacts are ***not*** permitted.

(b)Operation via any means other than those which use direct radio transmissions is banned. This includes all means such as IRLP or Echolink, which rely on contact via the internet.

(c) Contact via Satellites is also not allowed for scoring purposes.

6. Call

"CQ RD", "CQ CONTEST" or "CQ TEST".

7. Intervals Frequencies

(a) On ***ALL*** bands, stations may be contacted at intervals of not less than ***two*** hours since the previous contact on that band and mode.

(b) No points will be awarded for contacts between stations in the same call area on HF, except on the 160 metre and the 10 metre bands, on which entrants may work stations in the same call area.

(c) On the 10 metre band, contacts may also be made using the FM mode, using simplex only, on frequencies above 29.0 MHz only. This will be considered a different mode for scoring purposes, so an SSB or CW contact could immediately be made with the same station below 29.0 MHz for an additional score.

8. Working stations more than once

(a) On bands ***50 MHz and above***, the same station in any call area may

be worked using any of the modes listed at intervals of not less than *two* hours since the previous contact on that band and mode.

(b) **For the VHF category**, up to *three contacts* may be made with the same station consecutively on each band, but must be made using the different allowable modes of CW, SSB and FM. However, the different modes must be within the frequency ranges stated in the text descriptions of the latest Call Book as 'mode' only.

For example, on the two metre band, RD Contest CW contacts may only be made in the range 144.050 to 144.100 MHz. SSB contacts are restricted to 144.100 to 144.400, while FM contacts must be above 146.000 MHz.

The national simplex calling channels (146.500 MHz on the two metre band), and the frequencies either side thereof, excluding recognised repeater frequencies, are the **suggested** frequencies. When changing modes, entrants must also change frequency.

9. Single/Multi

(a) Both single and multi-operator entries are permitted. To be eligible as a single operator, one person must perform all operating and logging activities without assistance other than computer logging, using his or her own callsign. More than one person can use the same station and remain a single operator providing that each uses his or her own callsign, submits a separate log under that callsign and does not receive operating or logging assistance in any way other than computer logging during the contest.

(b) Holders of more than one licence or callsign ***MUST*** submit a separate entry for each callsign used.

10 Operating conditions

(a) Multi-operator stations are only allowed one transmitter per band/mode at any one time. Simultaneous transmissions on different bands are permitted. Simultaneous transmissions on the same band but using different modes are permitted. Any large multi-operator stations may find it more convenient to use separate band and/or mode logs.

(b) Automated operation is not permitted. The operator must have physical control of the station for each contact. However CW and voice keyers are permitted, although the use of computers **is restricted to** logging purposes only.

11. Valid Contacts

(a) For a contact to be valid, a three-digit serial number commencing at 001 and incrementing by one for each successive contact must be exchanged between stations making the contact. (RS/RST reporting is not required, but if given should be an accurate appraisal of the signal).

(b) Separate logs are required for entrants competing in both HF and VHF sections, although all allowable modes can be contained within each log.

12. Repeaters Forbidden

Contacts via repeater, satellite or relay are not permitted for scoring purposes. Contacts may be arranged through a repeater, although contact numbers may not be aired there. Operation on repeater frequencies in simplex is not permitted.

13. Score:

on 160 metres, two points per completed valid contact;

on 23 cm or higher bands, two points per completed valid contact;

on all other bands, one point;

on CW irrespective of band, double points.

all scores obtained between the entrant's local time hours of 0100 and 0600 are doubled. If working into an area where the time is outside those hours, the score is doubled only for the station whose local time is 0100 to 0600 hours.

14. Logs

Logs should be in the format shown below and accompanied by a Summary Sheet showing callsign; name; address; category; **sub sections**; for multi-operator stations a list of the operators; total claimed score; declaration: I hereby certify that I have operated in accordance with the rules and spirit of the contest; signed (postal mail only); date. **Please supply a contact telephone number if possible.**

15. Separate logs required

Entrants operating on both HF and VHF are required to submit separate logs and summary sheets for both categories. Separate serial numbers for HF and VHF operation.

Logs must be serial numbered sequentially on any band within and below, High Frequency for operation on bands below 50 MHz;

Logs must be serial numbered sequentially on any band within and above, Very High Frequency for operation on and above 50 MHz.

16. Outside Call Area

VK entrants temporarily operating outside their allocated call area, including those outside continental Australia as defined for DXCC, can elect to have their points credited to their home State by making a statement to that effect on their summary sheet(s).

17. Log Submission

(a) Logs can be submitted by electronic mail or postal mail:

By mail, send logs and summary sheets to: RD Contest Manager. Endorse the front of the envelope "Remembrance Day Contest". Peter Harding VK4OD, 40 Centaurus Cres, Regents Park, QLD 4118.

E-mail, PLAIN TEXT logs only may be sent to rdlogs@wia.org.au

(b) **Electronic Logging** is preferred but is by no means mandatory. Those entrants with a suitable PC may wish to consider it for this year. By using one of these programs, the file that is emailed to me can be imported easily into the scoring database program. Links for these programs are listed below. I have tried and tested them all and with the assistance of all the creators, they have rewritten parts of their program to assist scoring, On completion of the contest you can email the **VKnXXXX.csv,** which is a comma-delimited file format be, **which** can be imported into our database. *See Software download links note on the Contest section of the WIA web site.*

(c) In all cases, logs must be received by last mail on ***Monday 15th September, 2009. Late entries will not be eligible. Electronically sent logs will be returned with a courtesy note, also snail mail will be returned unopened.***

(d) If you are sending your logs by electronic means, I would recommend that you set the flag to request "confirmation of receipt" and "when the file is read". This way you will receive **two** confirmation messages. If you do not receive either return message please **send me an inquiry mail**. For users of snail mail, send a self addressed envelope with the sample reply form **to request a receipt for your paper log**, which is available at http://www.wia.org.au/contests/rd/Reply%20Form.pdf. HOWEVER in all circumstances the rule as in 17c above WILL STILL APPLY. So get the logs in early.

18. Certificates

Certificates will be awarded to the leading entrants in each **sub-section,** both single and multi-operator; in each State; P2 and ZL. Entrants must make at least 10 contacts to be eligible for awards, unless otherwise ruled by the Contest Manager.

19. Disqualification

Any station observed as departing from the generally accepted codes of operating ethics may be disqualified.

Determination of Winning State or Territory

Scoring will be achieved by taking the total number of logs for each State or Territory, divided by the total number of licences issued in that State or Territory (excluding beacons and repeaters) as published in the WIA Callbook for that year, and multiplying by the total score for that State or Territory. Points can only be considered where a station has submitted a valid log.

Unless otherwise elected by the entrant concerned, the scores of VK0 stations will be credited to VK7, and the scores of VK9 to the mainland call area which is geographically closest. Scores of P2, ZL and SWL stations will not be included in these calculations, although entrants in those areas are eligible for all certificate awards.

Receiving Section Rules

1. This section is open to all SWLs in Australia, Papua New Guinea and New Zealand. ***Licensed operators may enter this section but this will make them ineligible to also compete in the Transmitting sections.***
2. Rules are the same as for the Transmitting Section. The only double points will apply to ALL **received** CW contacts, and contacts **received** between 0100 and 0600 local time.
3. Only completed contacts may be logged, it is not permissible to log a station calling CQ.

Layout of logs:

The log should be in the format shown below whether submitted electronically or via mail. Sample logs are available on the WIA and local website or may be posted on receipt of a mailed request, accompanied by a stamped, self-addressed envelope.

Sample Summary Sheet:

Remembrance Day Contest 2009

Callsign: VK1xxx

Name: Operator's full name

Address: Physical address of contest station

Category: Single or Multiple Operator

Section: **HF or VHF**

Sub Section:

Transmitting Phone, CW or Open (both)

Total Score: number of points claimed

Declaration:

I hereby certify that I have operated in accordance with the rules and spirit of the Contest.

Note: ***Some software may require you to click on a button as your affirmation of operation according to the rules for this contest.***

Signed: Your signature if log is submitted via mail.

Date: date submitted

Sample Transmitting Log *Remembrance Day Contest 2009*

Callsign: **VK1xxx**

Category: **HF or VHF / Single or Multiple Operator**

Section: **Transmitting Phone, CW or Open**

Time (UTC)	Band (MHz)	Mode	Call	Number Sent	Number Rcvd	Pts
0801	14	CW	VK2QQ	001	002	2
0802	14	SSB	VK6LL	002	001	1
0806	14	SSB	VK5ANW	003	003	1
0808	14	SSB	ZL2AGQ	004	004	1
0811	14	SSB	VK4XX	005	008	1

Sample Receiving Log Name/SWL Number:

Category: **HF**

Section: **Receiving Phone:**

Time: (UTC)	Band (MHz)	Mode	Call 1st Op	Call 2Nd Op	Number 1St Op	Number 2Nd Op	Pts
0801	14	SSB	VK1XXX	VK2QQ	001	002	1
0802	14	SSB	VK1XXX	VK6LL	002	001	1
0806	14	SSB	VK5ANW	VK1XXX	001	003	1
0809	14	SSB	VK7AL	VK2PS	007	010	1

The Westlakes Cup
19 September
Schedule and Rules

Full details: http://www.westlakesarc.org.au/contest.htm

Date:
Saturday 19th September 2009. Time: 2030 EST (1030 Z) till 2130 EST (1130 Z)
Band: 3.535 - 3.620 MHz Mode: SSB, DSB, AM

Max Power Limit:
100 Watts Standard and Advanced Licence Holders, 10 Watts Foundation Licence Holders.

Rules:
All Stations shall call 'CQ Westlakes Cup'. Exchange for Points shall be the operator's name and a signal report:
After the contact is made and reports exchanged the station that had called 'CQ' must QSY at least 5 kHz from the frequency before calling again. There will be no 'sitting' on a frequency and working a 'pile up'. You must QSY after each contact is made.

Valid Contacts:
Only VK or Special Prefix (AX, VI) Australian stations may be worked. The contest may expand to ZL, P2 and other South Pacific neighbours in the future.

Points A:
There will be two BONUS stations operating in the contest. The BONUS stations are the stations that hold the Cup from the previous year's contest. The stations that are the BONUS stations will be worth 1 (one point) for the QSO plus 3 (three) bonus points and may be worked twice in the contest, once every half hour, if you can find the mischievous little devils. This year (2009), the BONUS stations will be VK7VH/BONUS and VK2FRKO/BONUS.

Points B:
Amateur radio clubs and WIA affiliated stations are encouraged to take part. Every amateur radio club that takes part in the contest shall be worth 1 (one point) for the QSO plus 1 (one bonus point). Every amateur radio club taking part shall sign with the call eg. VK2XXX/CLUB. WIA station calls such as VK2WI, VK4WIT, VK2BWI etc. shall qualify under the same scoring system as amateur radio clubs and must identify themselves with a /CLUB after the callsign eg. VK3WIA/CLUB. Amateur radio club stations and WIA club stations may be worked only once in the Contest hour.

Points C:
Every station that does not fall into the BONUS categories listed above shall be worth 1 (one point) per QSO and shall be worked only once during the Contest.

Points D:
SWLs shall be able to claim the same points as per transmitting stations. For example if an SWL hears a BONUS station they may claim 1 point plus 3 Bonus points. If they hear a Radio Club or WIA Club Station they can claim 1 (one point) for the QSO plus 1 (one Bonus point). They must record the callsign and information of both stations in the QSO.

Contest Procedure:
At 2015 EST (1015 Z) on 3.585 MHz +/- QRM, the BONUS station shall make an announcement outlining the basic rules of the Contest. For 2009 the station making the Announcement will be VK7VH. At the end of the basic outlining of the rules of the Contest VK7VH may pass the microphone to VK2FRKO to issue a word of encouragement and greeting to Contest participants. If there are any last minute questions to be asked then questions will be answered at this stage.

At two minutes prior to the beginning of the contest, the BONUS station shall make an announcement to the affect that the contest shall begin in two minutes. At the completion of the contest, the BONUS station shall call in all stations that wish to declare their scores for the contest. If, for any reason the BONUS station cannot perform these functions, the Westlakes Amateur Radio Club Contest Manager or a deputy will do the job.

The call-in shall be on 3.585 MHz +/- QRM and shall start from the lowest scoring stations, eg 10 points, up to the top scorers in the contest. During this process, additional stations may be seconded from the group on frequency to take call backs from any region which the BONUS station thinks his signal may not be covering well. Such station/s may receive a special certificate in recognition of their efforts.

The object of this 'Check In' after the contest is that stations may get an 'idea' of the contest results on the same night as the contest takes place although confirmed places will only be made known after the 'Contest Manager' has received and checked the logs.

Contest Logs:
An excellent logging programme has been produced by Mike VK3AVV and is available by typing VKCL into your Google Search Engine and follow the prompts in the VK Contest Logger.
Logs submitted in other formats shall contain the following information:

Cover Sheet:
Call Sign: Name of Licensee, Address of Licensee, E-Mail Address of Licensee, (optional) Points claimed including BONUS points.

Log Details:
Time: Local or 'Z', call worked, signal strength of station worked, and name of operator: Signal strength given to station worked.

Declaration:
'I declare that I have operated in accordance with the rules and spirit of the contest and in compliance with my licence conditions'.

Awards:
Inscribed cups shall be awarded to the stations with the highest points attained. If two or more scores are the same, the winner will be decided by the first person that contacted a BONUS station. There will be one cup awarded in the Advanced and Standard Licence Category (100 Watts) and one in the Foundation Licence Category (10 Watts). The cups shall be inscribed with the callsign name and details of the highest points scorer and shall be retained by the contest winners.

The stations that gain possession of the cups shall become the BONUS stations for the following year's contest. The Contest Manager retains the right to decide to change the rules of the next year's contest. Certificates shall be awarded to the first, second and third place getters in each section (Advanced/Standard, Foundation and SWL) of the contest. Additional certificates may be issued to those who, in the opinion of the Contest Manager of Westlakes Amateur Radio Club have contributed, maintained or attained prominence in any particular area of expertise or excellence in the contest.

Logs should be sent to:
The Contest Manager, Westlakes Amateur Radio Club P.O. Box 3001 TERALBA NSW 2284. Logs via Internet may be sent to the following E-Mail address: *contestmanger@westlakesarc.org.au*

The closing date for the receipt of logs will be
Friday 30th October 2009.

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Adelaide Hills Amateur Radio Society

Christine Taylor VK5CTY

The last meeting was another interesting one. We were addressed by Dean VK5LB who has experimented with many wire antennas over the years as he lives on a country property where there is room to put antennas up in the air.

He spoke of the virtues and disadvantages of the different antennas. The vee-beam performs very well where there is space for it. He compared centre-fed and unequal-sided dipoles, and the old faithful G5RV and concluded that this old favourite performed as well as either of the others and was more tolerant of the ends of the antenna drooping because of lack of space on suburban blocks.

While it is marvellous to have a beam that can be turned around to tune in the faint signal many very good contacts can be made with a G5RV fitted into our suburban block. Certainly aim for something better, but get a start with a wire antenna.

On 5th July AHARS was invited to the ETSA Museum where three very competent guides showed us their treasures and told us something of the history of our electricity supply in South Australia.

When we were looking at the old appliances there were lots of comments like "We had one of those" and "I remember that style".

The Museum has collected many of the early models of stoves, washing machines and radios and even has a genuine addressograph (with a plate making machine) that was about to be thrown on the dump. While we are glad to have moved with the times it is great to have been able to save from destruction the white goods of which our parents and grand-parents were so proud.

In another section we saw some of the very accurate instruments against which our domestic meters were compared so we could be sure we were only being billed for as much electricity as we used.

We also saw some photos including one of an early linesman replacing globes (and shuddered at the sight of a ladder from the back of a truck, held in place by another ladder sitting on the ground – the OH&S would shake in their shoes to see it today!!).

For those who went to the Museum it was a very good day, those who missed it missed a special treat. Thanks to a couple of our members and to the other volunteer staff of the Museum for arranging the day.

AHARS meet regularly on the third Thursday of each month and have a range of interesting speakers. Any visitors to VK5 are welcome. Please contact John VK5EMI or David VK5KC (formerly AMK) QTHR the callbook.

Don't forget the Buy and Sell on Sunday September 13th at Goodwood Community Hall

Full details page 54

The mid-year meeting of the Lower Murray Radio Club

As usual this takes the form of a dinner to which the President of AHARS and his XYL are invited (LMRC is affiliated with AHARS) in Murray Bridge.

Young and older members enjoyed a pleasant time. A photo shows the group this year.

The LMRC meets each week on a casual basis in the clubrooms provided by the local Lions Club at the Sports Ground. The Lions' provide similar clubrooms for many of the Murray Bridge hobby groups which is much appreciated.

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Jenny VK5FJAY, Jenny VK5ANW, Kevin VK5AKZ and Gerard VK5ZQV in front of a display board of domestic meters.

The assembled LMRC members with partners.

AMSAT

David Giles VK5DG

Book review and two new satellites

This month's feature article is a review of the ARRL Satellite Handbook. Also there are details on two new satellites in orbit, and a report on a very interesting project to come. But first a message from the AMSAT-VK group.

AMSAT-VK

In an email to the AMSAT-VK group, group coordinator Paul VK2TXT announced that they were discontinuing the HF net. Participation had been very low and it was felt that the net was no longer viable.

The other nets on EchoLink are still operating. I have updated the information box to reflect this and added VK5RSC and VK7AX. Please email me at vk5dg@amsat.org if there are any corrections needed.

The ARRL Satellite Handbook

by Steve Ford WB8IMY

In 1984 the first edition of "The Satellite Experimenters Handbook" was published. Written by Dr. Martin Davidoff K2UBC, it quickly became THE reference book for amateur satellite operators.

A new satellite reference book has recently appeared. "The ARRL Satellite Handbook" has been written by Steve Ford WB8IMY. Steve is also the editor of QST and Publications Manager of the ARRL. He has also written other ARRL publications on the digital modes. This review is of the first edition from October 2008.

The ARRL handbook is divided into six chapters and two appendices. The chapters have been written and compiled by Steve and the appendices were written by Dr. Martin Davidoff.

The book is aimed at the beginner and has a practical approach to setting up a ground station and using the satellites. The 200 pages contain many photos and diagrams.

Chapter 1: A Brief History of Amateur Radio Satellites. This chapter has excerpts from "Space Satellites from the World's Garage—The Story of AMSAT" by Keith Baker KB1SF and Dick Jansson KD1K. It covers the OSCAR satellites, the Russian RS series and amateur radio operations during manned spaceflight. From OSCAR I to DO-64, all OSCARS are discussed.

Chapter 2: Satellite Orbits and Tracking. This chapter describes different types of orbits, how they appear from your ground station, Doppler shift and tracking software. Sun-synchronous, dawn-to-dusk, and Molniya orbits are compared. Descriptions of satellite footprints, azimuth and elevation and Doppler shift are given so the reader can understand the outputs of the various tracking programs described in the second half of the chapter. The final section looks at Keplerian elements needed to keep the tracking programs accurate.

Chapter 3: Satellite Communication Systems. This chapter covers beacons, command links and analogue and digital transponders. The different types of telemetry beacons are looked at and show how they have progressed from simple CW telemetry to 9600 baud packet. Command links give a brief look at the role of the command stations. The transponders section discusses bent-pipe, linear, and digital transponders.

Chapter 4: Your Satellite Ground Station. This chapter discusses antennas, rotators, pre-amplifiers, transverters, and transceivers. Antennas from simple omnidirectional types to cross-polarised Yagis with fully computer controlled rotators are discussed. Some typical station designs are given.

Chapter 5: Satellite Operating. The first section is an in depth use of the 'FM' birds; AO-51, AO-27, SO-50 and the ISS. Also covered is AO-16, which was active at the time of publication. The next section looks at the linear satellites; AO-7, FO-29, VO-52 and DO-64 (which was usable as a linear transponder when published). The focus is on using VO-52. The third section is on digital satellites. APRS is the main topic with a brief section on using WiSP with GO-32 and CO-65.

Chapter 6: Amateur Satellite Projects. This chapter contains project articles from the ARRL Handbook, ARRL Antenna Book, QST and QEX magazines. Eight of the projects are antennas ranging from omnidirectional Quadrifilar Helix and Lindenblad to 2.4

GHz horns and dish feeds. The other two projects are a tracking interface to go between a computer and antenna controller and a simple Az-El rotator using two rotators.

Appendix A: Satellite Orbits. Written by Dr. Martin Davidoff, this chapter delves into the theory of satellite orbits. Those of you who have read the earlier editions of Davidoff's books will recognise the substance as it is mostly a copy. Unfortunately none of the illustrations have been presented in this edition so I found it rather hard going.

Appendix B: Other Satellite Subsystems: Structural, Environmental, Power, Energy, Attitude, Propulsion and Control. A long title to a chapter which describes what makes up a satellite. There is much more to a satellite than some solar panels, batteries, and radio circuits. The appendix discusses what goes into the design needed to make a satellite.

For example the Environmental Control section focuses on how the satellite's temperature is regulated in the vacuum of space. The satellite goes from direct sunlight where it is heated on one side at 1380 Watts/m^2, to the cold of the Earth's shadow. Add to that the problems of getting heat away from the transmitter section, keeping the electronics and batteries from freezing, overheating or sudden temperature changes, to keep the satellite operating as long as possible and you can appreciate the effort that goes into the design and engineering. An example is given for AO-7.

Like appendix A, this appendix is largely a copy from Davidoff's last edition.

But is this handbook the perfect addition for your shack? Unfortunately, it is not perfect. I found numerous little mistakes from the front cover (it is actually a picture of FO-20 not FO-29) through to the last appendix. Appendix A has the most mistakes with many formulae incorrectly typeset.

There are no particularly serious mistakes except the section of chapter 5 on using linear transponders. The operating procedures presented are not considered good practice by experienced operators and are not used with computer controlled tuning.

For those of you who have the book, please compare this chapter with the article "The one true rule for Doppler tuning" which can be found at http://www.amsat.org/amsat/features/one_true_rule.html

Overall the ARRL Satellite Handbook is a very good guide to amateur satellites. It comprehensively covers all aspects of working the satellites and is easy enough for the beginner. It is available from the WIA Bookshop for $48.00 plus postage (WIA member price).

PharmaSat and CP-6

Astute readers of this column will have noticed in last month's satellite review two very new satellites PharmaSat and CP-6. They were launched on 19/5/09 with the U.S. Military satellite Tacsat-3. The rocket used was made up from a Minuteman intercontinental ballistic missile and a Pegasus orbiter. Here is a

AMSAT-VK

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Paul Paradigm VK2TXT
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Group Moderator
Judy Williams VK2TJU,
email: secretary@amsat-vk.org

Website:
www.amsat-vk.org

Group site:
group.amsat-vk.org

About AMSAT-VK

AMSAT-VK is a group of Australian amateur radio operators who share a common interest in building, launching and communicating with each other through non-commercial Amateur Radio satellites. Many of our members also have an interest in other space based communications, including listening to and communicating with the International Space Station, Earth-Moon-Earth (EME), monitoring weather (WX) satellites and other spacecraft.

AMSAT-VK is the primary point of contact for those interested in becoming involved in amateur radio satellite operations. If you are interested in learning more about satellite operations or just wish to become a member of AMSAT-Australia, please see our website.

AMSAT-VK monthly nets

Australian National Satellite net

The net takes place on the 2nd Tuesday of each month at 8.30 pm eastern time, that is 9.30 Z or 10.30 Z depending on daylight saving. The AMSAT-VK net has been running for many years with the aim of allowing amateur radio operators who are operating or have an interest in working in the satellite mode, to make contact with others in order to share their experiences and to catch up on pertinent news. The format also facilitates other aspects like making 'skeds' and for a general 'off-bird' chat. In addition to the EchoLink conference, the net will also be available via RF on the following repeaters and links.

In New South Wales
VK2RMP
Maddens Plains repeater on 146.850 MHz
VK2RIS
Saddleback repeater on 146.975 MHz
VK2RBT
Mt Boyne Repeater on 146.675 MHz

In Victoria
VK3RTL Laverton, Melbourne,
438.600 MHz FM, - 5 MHz offset

In South Australia
VK5TRM, Loxton on 147.125 MHz
VK5RSC, Mt Terrible on 439.825 MHz
IRLP node 6278, Echolink node 399996

In Tasmania
VK7AX, Ulverstone on 147.425 MHz

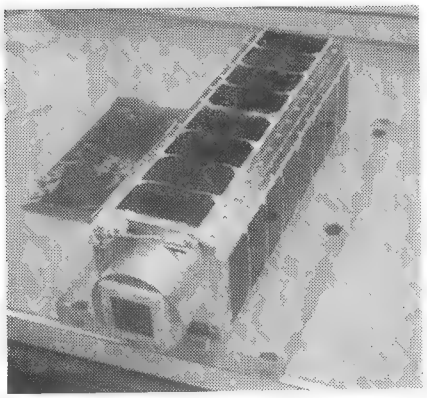
In the Northern Territory
VK8MA Katherine 146.700 MHz FM

Operators may join the net via the above repeaters or by connecting to EchoLink on either the AMSAT-NA or VK3JED conferences. The net is also available via IRLP reflector number 9509. We are keen to have the net carried by other EchoLink or IRLP enabled repeaters and links in order to improve coverage. If you are interested in carrying our net on your system, please contact Paul via email.

Become involved

Amateur satellite operating is one of the most interesting and rewarding modes in our hobby. The birds are relatively easy to access and require very little hardware investment to get started. You can gain access to the FM 'repeaters in the sky' with just a dual band handheld operating on 2 m and 70 cm. These easy-to-use and popular FM satellites will give hams national communications and handheld access into New Zealand at various times through the day and night.

Should you wish to join AMSAT-VK, details are available on the web site or sign-up at our group site as above. Membership is free and you will be made very welcome.



bit more detail on each.

PharmaSat

PharmaSat is a 5 kg spacecraft 'about the size of a loaf of bread'. It was developed by NASA and the Santa Clara University. PharmaSat follows on from the successful GeneSat-1 launched in 2006.

It contains a biological laboratory that has experiments with yeast cells. Data transmitted from PharmaSat includes temperature and pressure (to measure the yeast's environment) and an optical sensor to determine the health and state of the yeast. The yeast are fed sugars and an anti-fungal agent at three dosages.

The science team reported that the results obtained showed PharmaSat's experiment to be a success. PharmaSat is designed to allow biological experiments in microgravity without the need to use the space shuttle or ISS.

After two days in space the power and telemetry systems were confirmed and the experiment was started. Results so far indicate that conditions are nominal and that the yeast are growing.

The downlink frequency has shifted. The original frequency of 437.465 MHz has had to be revised as very few packets were being decoded by the ground stations. The beacon frequency is now between 437.457 MHz and 437.461 MHz. Amateurs in Australia, Brazil, Germany, Japan, Netherlands and the U.S. have successfully decoded and sent packets to the control stations.

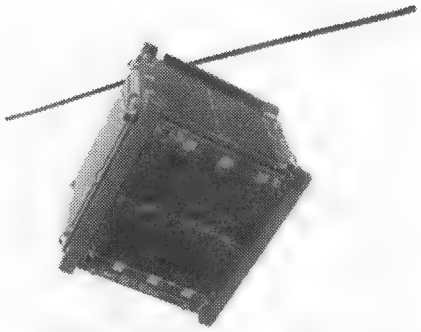
As of 15/06/09, the 70 cm beacon has been turned off so engineers can look at problems with the S-band system. The main website is at http://www.pharmasat.org A log of the main events in PharmaSat's life is at http://pharmasat.engr.scu.edu/OperationsLog.html

CP-6

Built by the California Polytechnic State University at San Luis Obispo, CP-6 is a cubesat whose mission is to demonstrate an attitude control system using magnetorquers. In other words, it adjusts its position by creating a magnetic field that reacts against the Earth's magnetic field to turn the satellite.

CP-6 sends telemetry on 437.365 MHz at 1200 baud. Unusually it transmits a CW identifier ("CP6"), then the packet frame using FSK every 60 seconds. For the best success in reception set your receiver to LSB and tune the CW for a pitch of 1200 Hz. The packet tones will then be at the right frequencies. CP-6 has two transmitters, COMM A and COMM B. COMM A is frequency stable but COMM B tends to wobble. Both are on the same nominal frequency.

Calpoly has packet decoding software



that will take data from a KISS TNC or a soundcard and the MixW program. Versions are available for Windows, Mac and Linux.

The software decodes the data and sends it via the internet to Calpoly. Download the software and install as per the instructions. It will ask for registration details if you have done so on the website. Make sure your TLEs are up to date in the file kepler.dat.

The program gives details of the satellite's position and times of the next pass. Mike Rupprecht DK3WN has details on his site on how to set up MixW for decoding. I have tried using a KISS TNC with little success. Colin VK5HI told me that a software setup using MixW works better. CP-6 is spinning rapidly and suffers from QSB.

Two other small satellites were also launched. Aerocube-3 does not use amateur frequencies. HawkSat-1 does have a downlink on 70 cm but is only activated over its ground station in the USA.

The website for CP-6 is at http://polysat.calpoly.edu/

Suitsat-2

Gould Smith WA4SXM, AMSAT VP of User Services recently released the latest report of progress on SuitSat-2. SuitSat-1 (AO-54) was a Russian Orlan EVA spacesuit on board the ISS that had gone out of service.

In 2005, amateurs had installed a 2 m beacon transmitting various types of messages into the helmet of the spacesuit. It was 'kicked out' of the ISS in February 2006. Unfortunately there was a malfunction of the antenna or transmitter and signals were very weak. But the experiment was successful in many ways and much was learnt for the next version.

SuitSat-2 improves on SuitSat-1 by adding a Software Defined Transponder, solar panels, and cameras. The helmet contains the antennas, radio, cameras, and safety switches. The suit body contains the control processor, up to four experiments and the battery. The solar panels are attached to the spacesuit's legs.

The software defined transponder receives on 70 cm and transmits on 2 m. The bandplan includes a BPSK beacon, a 16 kHz wide mode U/v linear transponder, a CW beacon, and an FM beacon for voice messages, 1k2 packet telemetry and SSTV. Pictures from the four cameras are processed on-board to determine the best ones, then converted to ROBOT-36 format to be transmitted by the FM SSTV beacon.

It is hoped SuitSat-2 will be ready by the end of 2009 for a 2010 launch. It is expected that SuitSat-2 will be in orbit for up to 6 months. Gould's report shows the various modules under construction and testing, displays of the transponder in use and even a SSTV picture taken in the lab. More information can be found at www.suitsat2.org

News From VK7

Justin Giles-Clark, VK7TW
Email: vk7tw@wia.org.au

It has been a busy couple of months of amateur radio in VK7 as you will see below and elsewhere in this magazine: Echoes of Apollo and a 325 km 3 cm Digital Record. Other events included the Southern Winter Hamfest on 6/7 June at the Sorell Men's Shed. The weekend saw construction, raffles, VK7SMS award station, homebrew competition (won by Corey VK7FCFC), displays of new and pre-loved equipment. Thanks to Ken VK7DY and Wendy VK7FWJS and all at the Men's Shed for a great weekend.

Repeater News

Brian VK7RR has worked miracles with VK7RTC 70 cm following the power amplifier being damaged. Brian has also raised the CTCSS level so it is high enough on both receive and transmit for anyone monitoring it. It sometimes has inter-modulation problems due to nearby commercial systems that use the same CTCSS tone. Plans are also underway to replace the original 26 year old antenna. Thanks Brian.

Tony VK7AX also lets us know that the licences for the new repeater VK7RTV at Gawler have come through and frequencies will be advised as they are brought into operation. The 6 m repeater will be the first and then the 2 m once the modifications to the diplexer are complete. Thanks Tony.

North West Tasmanian Amateur TeleVision Group

June 6 was a meeting at QTH of Ivan VK7XL and XYL Esme with guest speaker Barry VK7FR who discussed his experiences as a former ABC News Presenter in Papua New Guinea and many states of Australia including Tasmania for many years. The presentation even included a 'Bloopers' segment which was enjoyed by all. Thanks Barry.

Northern Tasmania Amateur Radio Club

For the Museums on the Air event on June 20-21, Gavin VK7VTX/VK7FLI was operating from the Furneaux Historical Research Association Museum at Emita on Flinders Island (IOTA awards OC-195). QSL cards go VK7VTX, care of Gavin Barnes, Lady Barron Post Office, Flinders Island 7255. NTARC is considering incorporation and draft rules are available to members on their website. There has also been much DX activity from Norm VK7AC using a switchable four square antenna utilising those now famous squid poles.

Cradle Coast Amateur Radio Club (CCARC) – Formerly NWTARIG

At a special general meeting on May 30, NWTARIG passed motions to change their name and incorporate. The club also welcomed new members, Scott and Kelly Wilson who are aspiring Foundation licensees. CCARC meeting formats were also decided with monthly meetings and every second one being a social meeting. The meeting venue is the Penguin Lions club rooms, 19 Ironcliffe Road, Penguin. The CCARC website can be found at: http://www.my-x15.net/ccarc

June 20 saw a large number of the North West Radio and Experimenters Social Group tour the Wynyard Aero Club. Some were even treated to joy-flights around the area. Thanks to the Wynyard Aero club and Eric VK7FEJE.

Radio and Electronics Assoc. of Southern Tasmania

Congratulations and welcome to the bands to Thomas van Geytenbeek VK7FTOM, Robin Smith VK7FRSA and James Cooper who were all successful Foundation Licensees in our last Foundation licence session and assessment.

REAST's July presentation was by the very funny Harvey VK7TED, starting with an outline of the many digital modes available to the amateur. Harvey tackled the Global ALE High Frequency Network. He has set up his radio to scan the various digital frequencies, beacon, listen and log those stations that are heard in the network. Harvey used two laptops connected at the sound card interfaces to demonstrate the handshaking and some of the functionality. Very interesting, thanks Harvey. The network uses freeware software by Charles Brain G4GUO and is a full Mil-Spec Automatic Link Establishment operation using HF SSB or ham radio transceivers.

The REAST ATV Experimenters nights have had a focus over the last month on both Software Defined Radio and the 40th Anniversary of the moon landing. Many historic videos have been screened of the event.

In the June 2009 edition of this magazine I featured the story of "Winnie the War Winner" for ANZAC Day. Recently, I was fortunate enough to visit the Australian War Memorial in Canberra where the original Winnie is on display along with the story of its creation. This is a fascinating piece of wartime radio history and well worth a look the next time you are in Canberra.

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The original "Winnie the War Winner" in the Australian War Memorial,

DX - NEWS & VIEWS.

John BazleyVK4OQ,
E-Mail: john.bazley@bigpond.com

Conditions are still not improving as predicted last year and there certainly has been no shortage of opinions!

But it is very interesting to see the amount of DX that is continually worked, admittedly mainly on the lower end of the HF Spectrum. It is also interesting to see the openings that were possible above 20 metres when we had a slight (short-lived) rise in the SFI.

As recently as 29th May 2009, an international panel of experts, led by NOAA and sponsored by NASA, released a new prediction for the next solar cycle. They predict Solar Cycle 24 will peak in May 2013 with a below-average number of sunspots.

> "In recent months, however, the sun has begun to show timorous signs of life. Small sunspots and "proto-sunspots" are popping up with increasing frequency. Enormous currents of plasma on the sun's surface ("zonal flows") are gaining strength and slowly drifting toward the sun's equator. Radio astronomers have detected a tiny but significant uptick in solar radio emissions. All these things are precursors of an awakening Solar Cycle 24 and form the basis for the panel's new, almost unanimous forecast. If our prediction is correct, Solar Cycle 24 will have a peak sunspot number of 90, the lowest of any cycle since 1928 when Solar Cycle 16 peaked at 78, says panel chairman Doug Biesecker of the NOAA Space Weather Prediction Centre."
>
> I particularly liked the final comment, "*Go ahead and mark your calendar for May 2013, but use a pencil.*"

The full report is available at (http://science.nasa.gov/headlines/y2009/29may_noaaprediction.htm) and makes interesting reading.

A more recent paper titled "**Mystery of the Missing Sunspots, Solved?"** at http://science.nasa.gov/headlines/y2009/17jun_jetstream.htm again this makes very interesting reading for it offers a theoretical explanation for the delay of the commencement of the new solar cycle.

So what have we to look forward to in the coming weeks?

Peter ET3BN, who also holds the call DM2BBN, will be in **Addis Ababa, Ethiopia** for the next few years, QRV on CW and SSB. For 80 metres he has a delta loop, for 30 metres, 17 metres and 12 metres a two-element Yagi. For the other HF bands a 3 element Yagi. At the moment he has no antennas for 160 metres, 80 metres or 40 metres. QSL to his Ethiopian address, Dr. Peter Haferkorn, P.O. Box 150194, Addis Ababa, ETHIOPIA.

The **Vienna International Amateur Radio Club (4U1VIC)** will be active with special callsigns this year. From July to December, to celebrate 30 years of the Vienna International Centre building look for 4U30VIC (that is 4U Three Zero VIC). For the purpose of DXCC all QSOs with these stations as well as 4U1VIC count for Austria (OE). For the CQ DX Marathon this is a separate country (entity). QSL via 4U1VIC.

Per LA5OPA will be operating from **Ambergris Cay** (NA-073) between July 26th and August 12th mainly on 20 m SSB and PSK31 signing V31NP. QSL direct or via the bureau.

David GI4UM is heading for Johannesburg on the 28th July and returning home on the 15th August. During this time he will be active as either 3DA0DJ or 3DA0SS from the International Scout Camp at **Manzini, Swaziland.**

Jim ND9M is expecting to return to **Diego Garcia** for another four month assignment starting in mid-August. He will be operating as VQ9JC and will apply for the special call VQ99JC, "*for use during a two-week period around the CQ WW CW Test in November*".

Wojciech SP9PT reports that a group of Polish radio amateurs, SP3CYY, SP9PT and SP9-31029, along with FO5QB will be on from **Tubuai in the Austral Islands, Hiva in the Marquesas** October 16-22. They will concentrate on lower bands and working Europe. Other parts of the world will not be ignored. They plan on being on CW, SSB, RTTY and maybe PSK31 on all the higher bands too, if propagation makes it worthwhile. The participants are paying all the costs and no sponsors are being accepted, so "We are going there for our own pleasure with our own money." The 160 m skyhook will be a vertical with two elevated radials or 12 on the ground. 80 m will be a square of four 18 m high verticals each with one elevated radial or 12 on the ground. Separation of the verticals will be 20.5 m. On 40 there will be two phased verticals. For 30, the same as 40 or a four-square. 20 - 10 m will have a hex beam and a vertical. They hope to have a receiving beverage directed toward Europe. Rigs will be a pair of K2s and an IC-7000, three 600 W amplifiers, and logging will be on three laptop computers. Look for them on 1827 and 1842, 3505 and 3795, 7005, 7075 and 7040, 10105 and 10143, 14025, 14190 and 14080, 18075, 18145 and 18103, 21025, 21295 and 21080, 24895, 24940 and 24923, and 28025, 28490 and 28080. QSL via SP9PT: Wojciech Klosok, P.O. Box 131, 44-200 Rybnik, Poland. http://fo2009sp.pl/

Newly-licensed hams in **Portugal, the Azores and Madeira** will have new licence classes and corresponding prefixes starting 1st June this year. The CEPT licences will start with CT7 for Portugal, CT8 for the Azores and CT9 for Madeira. The CEPT novice ticket will have a CS7 prefix for Portugal, CS8 for the Azores and CS9 for Madeira. These are also called New Class 1 and New Class 2. A third, New Class 3, will have CR7, CR8 and CR9 prefixes for the three different Portuguese DXCC entities. Old callsigns will be kept as they are, e.g. CU1 to CU9 for the Azores. CR1, CR2 and CQ8 will be for special event and contest callsigns.

Phil F5PHW is heading to **Tahiti (OC-046), French Polynesia** for a two year stay starting in August 2009. Plans are to be QRV as FO/F5PHW on CW, RTTY and SSB (sometimes) on 3.5

through 28 MHz. He will try to obtain a full FO5 call if possible. Phil will be staying in a small house near the local airport and will have an HF6 and dipole up and possibly a three element beam. He has a Web page at http://f5phw.chez.com QSL via F8BPN either direct or via the bureau. Phil will also post his logs to LOTW.

Gerard F2JD is back to the **Philippines** for at least five months. He hopes to be able to renew his previous licence (DU1/G0SHN) and to visit a few island groups during his stay. QSL via F6AJA.

Ron WB2GAI is celebrating his Golden Jubilee in amateur radio and will be active again as SV9/WB2GAI/p from **Crete** from 21st August to the 5th October. He will operate CW on 80-17 metres. QSL via bureau.

The dates for the PG5M Pacific DXpedition are September 6th until the 27th, when he will be active from three different DXCC entities. Firstly, September 6th and 7th, **Fiji, OC-016;** then **Tuvalu, OC-015**, September 8th until the 14th. Again, Fiji September 15th and 16th. Next, September 17th until the 23rd from **Kiribati, Tarawa, OC-017.** Finally, back to Fiji September 24th and 27th. The requested callsigns for the three QTHs are T2G, T30G and 3D2G. Gerben describes this as an "ultra light solo DXpedition," and will be CW only. QSL bureau or direct via his home call, PG5M. For direct, enclose at least 2 USD for return postage.

Special thanks to the authors of *The Daily DX (W3UR), 425 DX News (I1JQJ), Science@NASA, OPDX Bulletin and QRZ.DX* for information in this month's DX News & Views. Interested readers can obtain, from W3UR, a free two-week trial of The Daily DX from www.dailydx.com/trial.htm

ar

SPOTLIGHT ON SWLing

Robin Harwood VK7RH
vk7rh@wia.org.au

Iran jams, Twitter spreads, Jackson swamps

I am really looking forward to Spring to get away from the cold weather, as I have not been monitoring as much as usual. I am still finding it very interesting between 7100 and 7200 kHz.

Most of the broadcasters have departed but there are a few holdouts that show no inclination to depart and leave it to amateurs to thoroughly enjoy. The Chinese provincial broadcaster in Inner Mongolia is still there on 7105 and also putting out very weak spurs 10 kHz either side. China and presumably Taiwan are still locked on 7185 almost around the clock.

In the last week of June, I noticed that a Laotian station re-appeared after a break on 7145. It is audible around 1130 but does finish around 1300. However it is swamped by the sidebands of The Voice of Korea from Pyongyang on 7140. Laos is also very rarely heard on 6130 but that channel is heavily used by other broadcasters in our local evening hours. Both channels are relays from a domestic FM channel, hence the sporadic nature of its shortwave output.

As you all must be aware, Iran had a presidential election in mid-June. This was preceded by a major address by President Obama in Cairo. Extensively covered live by many broadcasting organisations, Obama's speech was regarded as highly influential especially in Islamic countries such as Iran.

Just ten days later, the Iranians held a presidential election and as the elections results quickly became public, the opposition candidate and his supporters cried foul. Huge spontaneous demonstrations broke out throughtout the nation and beyond.

The Iranians quickly tried to jam both satellite TV and shortwave broadcasts and curtailed the reporting activities of the international press. A respected BBC journalist John Leyne was expelled. However the demonstrators were able to disseminate what was happening using the Internet with Twitter and Facebook when Tehran prevented the domestic and international media from reporting inside Iran.

Naturally major international broadcasters quickly revamped their shortwave output to Iran in both Farsi and English. The authorities in Tehran were particularly scathing of the British, alleging they were attempting to destabilise the regime. That is why they mainly jammed the BBC Persian service on both TV and radio. The jamming was so intense that other legitimate satellite users were forced to find alternative satellites to use.

The Iranian crisis ended with a whimper as the authorities eventually gained control. International interest also waned as another event in North America quickly dominated the news, relegating the news in Iran to the back pages. And what was that event? The unexpected death of Michael Jackson in California. This rapidly took over and pushed out everything. In my opinion it was not news nor earth-shattering.

That is all for now. Do not forget you can email me your news and comments to vk7rh@wia.org.au.

Robin Harwood VK7RH. **ar**

Echoes of Apollo in VK5

Chris Skeer VK5MC

'The GS-15 PA has landed'. 'Moon-working' on EoA weekend, Chris VK5MC reports on another maiden voyage

It was a fun time, my first activity weekend with my new dish and a new GS-15 PA working for me. I was very surprised at some of the reports that I received on 1296 MHz.

26 June 29, 2009 OZ4MM heard, OZ6OL (55/55), VK3UM (55/55). G3LTF (54/54), SV3AAF heard, JA4BLC (549/559).

ES5PC was heard at moon set but not contacted.

27 June K2DH (569/449), W1O (O/O), W5JGE (549/559), W5J (57/56), VE7BBG (O/O), IK3COJ (559/559), SP6JLW (569/559), OH2DG (569/559), JA8ERE (569/449), HB9MOON (55/55) spent some time talking to some children at the Zurich end of the QSO, G4CCH (55/56), SM6FHZ (559/449), HB9SV (569/559).

28 June VE6TA (579/549), W1M (58/57), K0C (57/56), VK3UM (55/55), W5J (579/559), RK3WWF (559/449) could not get down to moonset as the wind was gusting quite high so I parked the dish for safe keeping.

I had to send QRZ quite a few times not because the signals were weak, mainly because I and the rest of the visitors present were a little rusty on the CW, it can only improve.

It is great to be back on EME once again. **ar**

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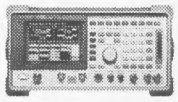

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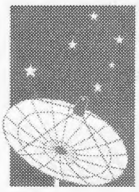

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VK2	VK2WI:	Sunday 1000 and 1930 local, on 1.845, 3.595, 7.146, 10.125, 14.170, 28.320, 52.525, 145.6000, 147,000, 438.525 and 1273.500 MHz. Also 5.425 MHz USB in the morning.. Plus provincial relays both sessions and country relays in the morning via local repeaters. VK1WIA news is included in the morning.
VK3	VK1WIA:	Sunday 10:30 am and 8 pm Local Time. Amateur Radio Victoria VK3BWI B/cast Network: 3.615, 7.158, 10.133,147.250 VK3RMM Mt Macedon, 146.700 VK3RML Mt Dandenong, 147.225 VK3RWG Mt Baw Baw, 4339.800 VK3RMU Mt St Leonard.
VK4	VK1WIA:	Sunday 0900 local via HF and major VHF/UHF repeaters.
VK5	VK5WI:	Sunday 0900 local, on 1.843, 3.550, 7.140, 28.470, 53.100 AM, 146.900 (SE), 146.925 (CN), 147.000 and 439.975
VK6	VK6WIA:	Sunday 0900 local, on 1.840, 3.582, 7.140, 10,125, 14.116, VK6RHF Perth 29.680, VK6RAP Perth 53.800, VK6RAP Perth 146.700, VK6RMW Mt William 146.900, VK6RBN Busselton 147.350, VK6RUF Roleystone 438.525, and on UHF CB Ch 1 Perth North. Sunday 1900 local, on 3.565, VK6RHF Perth 29.680, VK6RAP Perth 53.800, VK6RAP Perth 146.700, VK6RMW Mandurah 146.900, VK6RMS Mt Saddleback 147.250, VK6RBN Busselton 147.350, VK6RUF Perth 438.525, and on UHF CB Ch 1 Perth North Also in 'Realaudio' format from the VK6WIA website.
VK7	VK7WI:	Sunday 0900 local, on 1.840 AM, 3.570, 7.090, 14.130, Hobart CB 27.225 LSB, 28.525, 53.825 FM, EchoLink Node 100478 (VK7AX-L) 145.350, VK7RMD NW 146.625, VK7RAD and VK7RHT South 146.700, VK7RNW NW 146.750, VK7RAA North 147.000, Ulverstone 147.425, Ulverstone 444.250/449.750 and Hobart UHF CB Channel 15. Tuesday 2100 local VK7RMD NW 146.625.
VK8		Sunday 0900 local, on 3.555, 7.050, 10.130, 14.180, 145.400 IRLP 6800 Katherine and 146.900 Darwin. Sunday 2000 local 145.400 IRLP 6800 Katherine.

Note that many clubs broadcast the WIA News via local VHF and UHF repeaters. Check the News section of the WIA website.

EME on three milliwatts!

From page 23

The PI9CAM team using a 25 metre dish completed quickly with us at 10 milliwatts giving us -22 dB and again at three milliwatts with signal levels of -26 dB. An attempt at one milliwatt was not successful. Never-the-less with a three milliwatt completion we were "over the moon!".

Other stations copied on SSB were VE3KEP, 4/1; W5J, 5/8; N6JMC, 5/8; VK5MC, 5/6; KF6JBP, 5/7; SP6JLW, 5/6; N6BDE, 5/8 and RD3DA at -5 on JT65.

We also took many hours of video that will be cut into ATV presentations in the near future.

We acknowledge the support of the University of Tasmania and Dr Jim Lovell in providing access to the dish and especially the efforts of the site technician, Eric Baynes VK7BB, in making this a very successful exercise which allowed us to explore the limits of QRP EME.

ar

Mt Pleasant dish at night.

'SSB Fun event'

From page 24

The Moon, that big bounce target, is so far away that 98% of the power leaving an Earth-based antenna is lost; only 2% actually hits the Moon. Then only 6.5% of that power is reflected and then 98% of that is lost getting back. A quick calculation (2% of 6.5% of 2%), gives a very small return signal indeed.

To add to the difficulty the Moon is a moving target half a degree wide. The dish gain at high microwave frequencies makes tracking a challenge in itself, but that is all another story…

At right is the VK3UM 8.6 metre dish with Doug VK3UM and Max VK2ARZ giving a bit of size relativity.

Below is the scene at HB9MOON during the exchange between two Swiss lasses and "the man in the Moon" AKA Doug VK3UM.

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